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## DISEASES OF THE NASAL ACCESSORY SINUSES IN CHILDREN*


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We shall endeavor to discuss the frequency and importance of the diseases involving the nasal accessory sinuses in children: first, as a localized process within the sinus; second, as to the effect upon the general health of the child if these conditions are not recognized and appropriate treatment is not instituted.

The frontals in children being either absent or very small, will not be discussed separately, but our remarks are to be construed as dealing with the entire upper respiratory tract.

Allen, working in the University of Iowa a number of years ago, examined and measured the sinuses of a large group of children showing the development for each year from birth to fourteen years. We will show a slide giving a summary of this work.

The nasal accessory sinuses are bony cavities lined with ciliated epithelium, having direct communication with the upper respiratory tract. The anatomical and histological construction of the sinuses is such that they do not have the barriers or fortifications to resist infection as effectively as the lungs. Due to their method of drainage they are an easy prey to infections from the time of birth.

The lymphatic system of the upper respiratory tract is arranged differently from the lungs, consequently the modes of invasion and the results of infection differ in the several separate parts of the respiratory system. The course of infection of the different sinuses is fairly well established from the upper respiratory tract to the lungs. This condition has been described by Wasson as bronchosinusitis disease. Here we have a type of infection that typically portrays the rapidity and generalized way that infections can spread through the entire respiratory system.

The causes of sinus disease will be discussed under the following heads:

(1) Infectious
(2) Nutritional or metabolic
(3) Allergic
(4) Mechanical

Infectious sinusitis, which predominates, will receive the principal consideration in this paper.

From a few days after birth we are constantly called upon to treat the upper respiratory system for some foreign invasion of pathogenic bacteria. Unfortunately, in too many cases it continues in varying degrees until there is established a definite pathological lesion, such as sinusitis, laryngitis, tonsillitis, or bronchitis. My experience has been that 80 per cent of the pediatricians' work is in the upper respiratory system of the child. The neglect of these invasions can, from a very insignificant infection, become a troublesome persistent problem.

In acute infections, often the entire respiratory tract is involved. The subacute or chronic conditions would more fittingly come under the heading of this paper. The acute exacerbations are more often seen as a pansinusitis, but later they involve one set of sinuses or one individual sinus. Occasionally a particularly virulent acute pansinusitis may run a violent course and develop severe complications resulting in death, as illustrated by the following case:

*Case 1.*—A child, age nine years, was admitted to the hospital in a semi-comatose condition with a history of a cold two weeks previously. He suddenly had a generalized swelling of the whole face, marked over the left orbit, with a temperature ranging from 102 to 105°. In his periods of consciousness the child com-

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plained of having a severe headache. X-ray examination showed a diffuse clouding of all of the sinuses, characteristic of an acute pansinusitis. This child died within forty-eight hours of admission. The autopsy showed a generalized pansinusitis with bronchitis and a large abscess in the right frontal lobe of the brain.

We are reporting this case to show how rapidly and severely the sinuses may become involved, and the extent and rapidity with which the infection may travel.

Asthmatic bronchitis, if we are allowed so to designate it, is a condition that is often seen accompanying sinus disease. This condition alone demands close study. At times a simple incision of the ear drum will immediately, as if by magic, entirely remove all symptoms from the chest. There are other involvements that require more radical procedures, such as irrigating the sinuses and opening of the sinuses and mastoids.

Frequently operative procedures are followed by a cough that requires close observation of the entire respiratory tract before it may be satisfactorily treated. A child with a generalized involvement of the upper respiratory tract who is apparently convalescing, suddenly and without warning develops a severe intestinal infection that is unyielding and resistant to treatment.

No paper dealing with sinus diseases in children would be complete without some mention of allergic conditions. It has been conclusively proven that a deficient diet can and does produce sinus suppuration. Certainly a deficient diet plus infection is the beginning of a more serious involvement.

It is believed that the pathological changes in the nose and sinuses in allergy are similar in every respect to those which occur in the bronchial structure in bronchial asthma. The allergic nose and asthmatic chest are certainly closely associated in the periodicity of their attacks.

The part played by bacteria in the etiology of nasal allergy has not been proven, and the general consensus of opinion is that bacteria are secondary invaders. Certain experimental work by Wenner suggests that in allergic cases the cilia are paralyzed, thus interfering with their protective function.

Allergic sinus diseases with or without secondary infection should be differentiated from primary sinus infections. A careful examination of the nose and accessory sinuses should be made in every case of allergy, as the sinuses play an important part in many cases. Dean states that the presence of 10 per cent or more eosinophils in a nasal discharge is indicative of allergy, but the absence of eosinophilia does not exclude allergy.

We see children who do not gain in weight, whose foods are not well digested, who have occasional spells of vomiting with acidosis and varying degrees of malnutrition. This type of case we often fail to diagnose early, but later find in it a subacute or chronic infection.

In the early stages of malnutrition where children are living in poor hygienic surroundings with improper nourishment, we are more than likely to find a condition not amenable to the usual treatment. In Florida, we believe, the incidence of sinus infection is lower than in some other sections of the country.

In cases of bronchosinusitis, chest symptoms predominate and frequently the question of a pulmonary tuberculous infection has been raised. In these cases treatment of the chest condition is of little avail unless the primary focus of infection in the sinuses is eliminated.

Why, after a simple incision in the ear drum, with a free drainage of pus, a cough should clear up, as if by magic, is not clear to us.

*Case 2.*—A child of sixteen months was admitted to the hospital with a diagnosis of acute otitis media with asthmatic bronchitis. His temperature was 102°. His intestinal tract was essentially negative. He was coughing with practically every breath and had an asthmatic wheezing. The chest was essentially negative. Both ear drums were incised, with free drainage of pus, and in forty-eight hours the chest was entirely negative and the cough had disappeared.

*Case 3.*—A child seven years old was admitted to the hospital with a diagnosis of asthmatic bronchitis. His temperature was 101°. He had difficulty in breathing and proved to have a double maxillary sinusitis. The sinuses were opened, drained and irrigated and the cough promptly subsided.

We often see a child with an acute upper respiratory infection with considerable disturbance of the intestinal tract. The sinuses are treated and the child immediately shows a marked improvement in the intestinal condition.

*Case 4.*—A child three years of age was admitted to the hospital with a diagnosis of colitis and a temperature of 104°. There was marked involvement of both maxillaries and both mastoids. After palliative treatment the sinuses were drained and the child had an uncomplicated recovery.

The undernourished child, who is unable to digest food, is not gaining in weight, and has

had a long series of intestinal upsets, frequently improves after the sinuses are treated.

We believe, in a large number of cases, that infections once entering the upper respiratory system, develop into a bronchosinusitis with all the complications unless they are carefully handled. Early diagnosis with appropriate treatment is necessary. The type of infection in the several different cavities is almost always of a mixed type. This is to be expected from the association of many different infections from birth.

Apparently, on account of our geographical situation, we see so few cases of arthritis that we have passed over this phase of the subject. Kidney complications are seldom seen by us and we are convinced that as a general rule our sinus infections must not be so virulent as in some other sections of the country.

In the treatment and care of sinus diseases it is necessary to have the fullest cooperation of the roentgenologist, rhinologist and pediatrician. It is futile to attempt to make a thorough survey of these cases unless the consultants are in full accord and in sympathy with each others' views. The type of treatment, whether medical or surgical, palliative or radical, does not properly come within the scope of this paper.

In many instances, we might avoid radical procedures by careful study of diseases involving the upper respiratory tract. Repeated colds and indefinite signs of sinus involvement should be carefully studied. By so doing we may prevent radical procedures which would jeopardize the life and health of the patient.

In the radical Caldwell-Luc operation, just what are the possibilities of devitalizing teeth in children? If the teeth may be devitalized as a result of this operation, then the intranasal route is the desirable one. In children chronicity is less frequently encountered than in adults and probably the less radical operation will be sufficient. The type and extent of disease should determine this point. We should be guarded in advising operations upon allergic sinuses in children. We do not mean by this that no allergic case should receive surgical treatment. If infection is a predominating factor they should be treated accordingly.

The method of diagnosis of sinus diseases, we believe, has been well established. The controversy between transillumination and x-ray has about died out. We believe that the greater number of good men are relying upon x-ray interpretations for the diagnosis of sinus disease. Properly interpreted roentgenograms are essential for definite conclusions. The roentgenograms must be of good quality and the roentgenologist's opinion will be in direct proportion to his knowledge of sinus disease.

## CONCLUSIONS

(1) We believe that sinus involvements occur in practically all acute upper respiratory tract infections.

(2) If these conditions are allowed to go unrecognized and untreated they frequently result in chronic conditions.

(3) Chronic sinus infections are frequently responsible for chronic chest infections, digestive disturbances and certain cases of malnutrition.

(4) Early recognition and proper treatment of these cases requires the closest sympathetic cooperation between the pediatrician, rhinologist and roentgenologist.

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## DISCUSSION (*Abstract*)

*Dr. Alfred L. Gray, Richmond, Va.*—For correct diagnosis of a sinus condition, we must have good x-ray films, made in the proper positions, and of such quality that changes will be shown.

It is a difficult thing, as you who are engaged in this work very well know, to get a child in the proper position and keep him there long enough to get a film without any motion, even using the highest-powered machines.

There are so many remote conditions that do not point directly to sinus infection which may be due to it, that it should be almost a routine to examine the sinuses in chest or gastrointestinal abnormalities in cases of simple malnutrition or any form of low-grade anemia.

It is very much simpler to cure a sinus infection when it is discovered early, while it is yet acute, than it is after the mucous membrane has become infiltrated, boggy and thickened. Then the ordinary operation of opening and drainage by the simpler method may be and probably will be entirely ineffective.

In chronic cases, the Caldwell-Luc operation is the only operation on the antrum that produces a definite curative effect. After the diseased mucous membrane is scraped out, the patient will get well. The cases reported today were in children from birth up to 12

years of age. They fall within the scope of the pediatrists. Nothing was said about the diagnosis of involvement of the sphenoid sinus. Sphenoid sinuses are not developed in little children, but toward the end of the pediatric age they have developed, and particularly in children approaching the age of 12 years we should make the examination by one of the approved methods to determine whether or not the sphenoids are involved.

*Dr. F. T. Mitchell, Memphis, Tenn.*—We pediatrists are interested in the results both acute and chronic which follow in the wake of respiratory tract infections.

The diagnosis ultimately lies in their localization by the x-ray man and the one who examines the nose and throat. Of course we can only be suspicious, as a rule, because of the history of some chronic infection or the presence of malnutrition.

The attitude generally, I am sure, is that major surgical procedures on the little child should be resorted to rather infrequently, and that perhaps lately, by some few men at least, the thing has been more often done than is now considered really necessary. The palliative measures, irrigation, the lesser procedure of drainage, plus always the attempt to build up the general resistance of the patient with treatment and change of diet and habit, and with some, change of climate, and occasionally the ultra-violet lamp and sun bath, will usually benefit the patient more than a drastic surgical procedure.

The differential diagnosis between chronic chest conditions which originate in the upper respiratory tract and tuberculosis is important. We see both conditions in our work with great frequency, and it is often with the greatest labor that we are able on the one hand to rule out tuberculosis and on the other to rule out the other conditions. Careful history, with particular regard to exposure to tuberculosis, repeated tests for tuberculosis, careful temperature readings, and most of all, carefully taken and carefully studied x-ray films of the maxillary sinuses are needed.

More than one line of work or one single individual are needed to arrive at a definite conclusion as to what is the best thing to do in a single case. The otolaryngologist, the x-ray man and the pediatrician should be in almost constant consultation.

*Dr. D. A. Rhinehart, Little Rock, Ark.*—For some years we have made fluoroscopy of the sinuses a routine part of each fluoroscopic examination. It is surprising how many unsuspected instances of sinus infection, even of the chronic form, are detected in this way. We believe that an examination of the sinuses should never be omitted when a child is sent for examination of the lungs because of an intractable cough. Most of these will be found to have broncho-sinus disease, from which they will recover when the sinus infection has subsided.

*Dr. Dickinson (closing).*—I have tried fluoroscopic examination of the nasal accessory sinuses occasionally with adults, but in my opinion only the grossest type of changes can be recognized in this way. I do not believe that it would be a feasible procedure in children.

## GROSS AND MICROSCOPIC PATHOLOGY OF THE MAXILLARY SINUS*

By Robin Harris, M.D.,
Jackson, Miss.

Inherited biologic peculiarities are responsible for most allergic manifestations in man. There is a tendency for all forms of sinus disease to run in families. This may be due to infection from constant association as is often seen in tuberculosis. It may be due to some dietary deficiency, as practically all members of a family eat like food. But there may be an inherited predisposing tendency. I am convinced that the latter is true, at least in some instances.

Recurrent attacks of inflammation in the nose and concurrent extension into the sinuses produce chronic inflammatory changes in the lining membranes of the sinuses, resulting in gradual but progressive thickening of the sinus linings. When chronic infection takes place in a sinus usually all of the sinuses on the same side are to some extent involved. Even the most painstaking care in cleaning out the worst affected sinus by radical operation does not always cause resolution of the inflammation in the other sinuses. The process goes on gradually and in a few months or years other sinuses of the same side have to undergo radical operative procedures. The fact that there is a strong impression among the laity that one nasal operation calls for a second and a third and so on is, to my mind, to a certain extent due to temporizing surgery, for example, an intranasal antrumotomy for a chronic inflammatory condition that has been present and growing worse for years. In chronic maxillary sinus disease the more radical the procedure the more lasting and happy are the results. No radical operation is complete until every vestige of lining membrane is removed from that sinus.

*Case 2322.*—This was a middle-aged woman, the wife of a dirt farmer, who had been suffering from repeated and frequent attacks of cold, together with pain on the right side of the face, for years. The pain was principally over the right eye. In the skiagram there

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was a marked increase in density of the right antrum, less in the left. The frontals were rudimentary. At operation the antrum was found filled with a markedly thickened polypoid lining membrane. The nasal mucosa was atrophied. Microscopic examination showed an edematous and infiltrated submucosa with atrophic and narrow mucosa. The blood vessel walls were thickened and the lymph channels in the bone were dilated.

Fig. 1-A, Case 2322

Fig. 1-B, Case 2322

*Case 2325.*—A young office worker 22 years old, who had been suffering with severe headaches for four years, had thick yellow pus in both sides of the nose which did not lessen under intranasal treatment. The skiagram indicated involvement of all sinuses, the right antrum being worst. Complete exenteration of the

Fig. 2-A, Case 2325
Pan-sinusitis of long standing.

Fig. 2-B, Case 2325
Remarkable in that there is practically no bone pathology.

ethmoids and sphenoidectomy had been done on both sides six months previously. A right radical antrumotomy according to the method of Caldwell-Luc was my first procedure. The lining membrane was found much thickened, red, granular, and quite friable. There was some pus in the antrum. The lower turbinate was atrophied. Strangely, there was nothing remarkable in the microscopical study of the bone. There was marked lymphoid cell infiltration of the connective tissue with a few polymorphonuclears. There was much cellular infiltration of the submucosa with a fairly normal mucosa. Some of the blood vessels presented thickened walls and the lymph vessels were dilated. There were also numerous plasma cells, and some multinuclear endothelial cells.

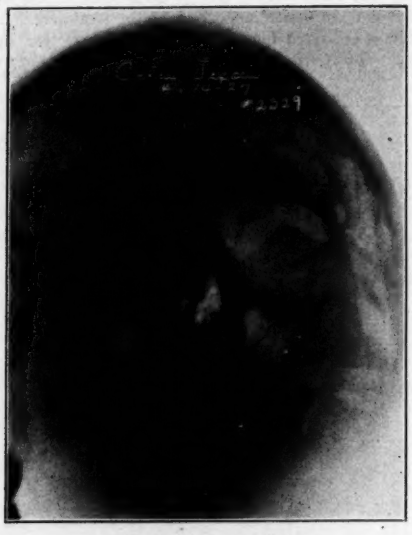

Fig. 3-A, Case 2329

Marked subjective symptoms of pain and dizziness with practically no clinical evidence of sinus disease. Skiagrams showed nothing for five years and very little at any time. Relief from pain and dizziness following operation was complete and lasting.

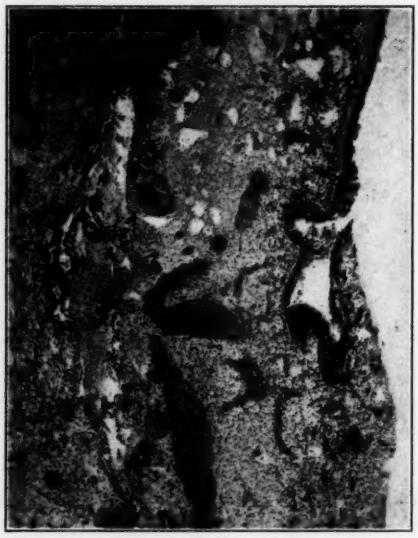

Fig. 3-B, Case 2329

Feature of this specimen is large number of thin walled blood vessels choked with erythrocytes.

*Case 2329.*—This patient was a young nurse who began work in my office in 1925. She had had pain in the left side of the face for three years. All of the upper molars and bicuspids on the left side had been extracted with no relief. The x-ray showed increased density in the left frontal and left ethmoid. In December, 1925, I did a complete exenteration of the left ethmoids and opened the sphenoid. There was no relief from pain. X-ray at this time showed no antrum disease. In the spring of 1926 she began to complain of dizziness, especially on moving the head up when leaning over, or backward when erect. In November, 1926, an external frontal sinus operation was done according to the method popularized by Lynch. The frontal lining was found markedly thickened, especially at the lower angle and externally over the eye. At this time, of course, the ethmoids were gone over carefully and recleaned. There was no relief from either the dizziness or the pain. Radium was used over the spheno-palatine area with no relief. The pain continued to grow worse. In April, 1927, x-ray showed some increased density in the left antrum and less in the right. Antrum lavage throughout two and a half years of study was always negative. In November, 1927, a bilateral radical antrum operation was done under ether. The mucous membrane was found markedly thickened and polypi were numerous, especially in the left antrum. Recovery was uneventful. I saw this young lady recently. She has had no pain and no dizziness since her antrum operation. She is entirely healthy and very happy over her complete recovery from pain.

*Microscopic Examination.*—The feature of the specimen is the large number of thin walled blood vessels filled with erythrocytes. The lymph channels were widely dilated and several blood vessels were completely occluded.

*Case 2344.*—This patient had suffered with severe pain over the right side of the face for several years. Septum operation and ganglion injection had been done in Chicago two years previously with complete relief for a year and a half. He had a stack of x-ray pictures knee-high. All of these showed a distinct, large polyp or cyst in the right antrum. I had seen him on two previous occasions and made pictures, which also showed the above indicated condition. On September 13, 1928, I did a right intranasal ethmoid and sphenoid operation. The lining of the ethmoid cells was found to be tough, thick, and apparently badly diseased. I expected to do a radical antrum a few days later, but the patient got such marked relief that he decided not to have it done, and had no more pain for ten months. In August, 1929, he returned complaining of severe pain in the right side of the face and as a matter of routine I made additional skiagrams. At this time there was no sign of the polyp. He insisted upon operation. On opening the antrum the lining was found to

be very little thickened and there was no pus and no polyposis. However, I cleared the antrum completely of all lining membrane as in any Caldwell-Luc antrumotomy. The patient had no pain after the first ten days following operation. Section of the bone showed congestion and there were dilated lymph channels in the marrow spaces.

Fig. 4-A, Case 2344
Marked increased density of the right antrum.

Fig. 4-C, Case 2344
Lipiodol injection. Both this and previous picture indicate that the antrum is nearly filled with the large cyst.

Fig. 4-B, Case 2344
Lipiodol injection.

Fig. 4-D, Case 2344
While study of the soft tissue was uninteresting, section of the bone showed congestion, bone resorption and lymph channel dilatation.

*Case 2350.*—A middle-aged farmer was referred to me by Dr. Harley Shands for suspected focal infection. He had had a discharge of thin, yellow, foul pus from the right side of the nose for many years. There was a large polyp in the left ethmoid region. X-ray showed marked increase in density of the left antrum and left ethmoid. A radical antrum left and left ethmoidectomy were done under local anesthesia. The lining membrane of the antrum was greatly thickened and polypoid in spots. There was much free pus in the antrum. Section showed subacute inflammation of the mucosa and the submucosa. The former was hyperplastic and the latter infiltrated with many round cells. There were yeast-like, budding, double-walled bodies present among these infiltrating cells. There were also indefnite foreign body giant cells.

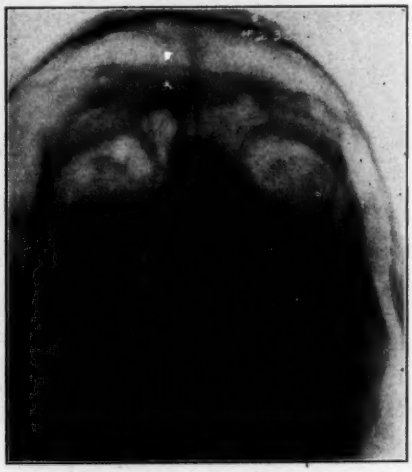

Fig. 5-A, Case 2350

Fig. 5-B, Case 2350

The yeast-like, budding, double walled bodies among the infiltrating cells and the indefinite foreign body giant cells make this an interesting specimen.

## SUMMARY

*Case 2325* had long standing pan-sinusitis, and yet there was nothing remarkable in the microscopic study of the bone from the antrum specimen. *Case 2329* was significant in that the subjective symptoms were present and marked long before there were any clinical or laboratory signs of sinus disease, and yet microscopic study indicated a pathological condition of long standing. In *Case 2344* the subjective symptoms were out of all proportion to the pathological findings, but the relief following operation was pronounced and lasting. In *Case 2350* the disease was definite, but not different from many such cases of the same type. The yeast-like, budding bodies present were significant, and there were present also indefinite foreign body giant cells. These latter findings are not at all uncommon in southern Mississippi.

## CONCLUSION

The value of microscopical study in sinus disease has long been recognized. Usually the man who makes this study has not treated the patient or seen the diseased tissue *in situ*. When some genuinely good pathologist turns rhinologist and correlates the gross and microscopic study, we shall learn a great deal more about this subject than we at present know.

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## DISCUSSION (*Abstract*)

*Dr. Louis Daily, Houston, Tex.*—For years I have observed an atrophic type of sinusitis, in which the patient suffers from systemic absorption, but operation shows very little apparent disease. Nevertheless, these patients improve tremendously after operation. Emmerson has shown that the bacteria in these cases lie deep, involving the periosteum and sometimes even the bone. Of this type, probably, were the cases which Dr. Harris demonstrated. There were scarcely any gross pathological findings at operation, but microscopic sections from the bone showed an extensive involvement. Dr. Harris states that he got the best results in these cases. This has been our experience with atrophic sinusitis.

# A NEW (PLASTER YOKE) DRESSING FOR FRACTURE OF THE CLAVICLE*

*By* R. WALLACE BILLINGTON, M.D., F.A.C.S.,† Nashville, Tenn.

While fractures of the clavicle are not considered very serious injuries, as a rule, and they usually unite with good function, yet most of you will agree that patients with this injury, especially adults, are quite uncomfortable in the dressings and splints commonly used in the treatment, which require frequent adjustment and redressing. This means that a perfect or approximate reduction of fragments is not being maintained continuously during the healing process, and this results in more or less malposition and excess of callus, or deformity.

Having used most of the methods of treatment without complete satisfaction to my patients or to myself, I have devised what I call a plaster yoke dressing which I shall show you. I shall explain briefly its advantages and method of application.

To reduce deformity and maintain proper relation of fragments, the shoulder must be brought upward, backward and outward and held persistently and positively in this position. With few exceptions it is easy to reduce the displacement, usually not even requiring an anesthetic, but to effectively maintain this position and correction continuously for three or four weeks in an ambulatory patient is a very different and difficult proposition.

Objections to the more common methods in use are, briefly, as follows:

(1) The clavicular cross or posterior T-splint (which is now probably the most popular method) will not hold the shoulder up. The bandages or straps holding it in place will become loose or displaced from time to time. It is very uncomfortable when the patient lies down and he cannot sleep comfortably on the back or either side. Immobilization is incomplete for it will slide downward in spite of all efforts, letting the shoulder drop.

(2) Recumbent treatment on a firm pad between the shoulders will give good results, but very few patients can be kept flat of their backs continuously for three or four weeks for this injury.

(3) Sayre's adhesive dressing will not maintain reduction, it is very uncomfortable, the adhesive gradually slips and loosens and often irritates the skin. It requires frequent tightening up or reapplication and prevents all use of the hand.

(4) Velpean's and Desault's dressings do not, at least for very long, maintain the correct position, as they become loose and slip readily.

(5) A posterior figure-of-8 bandage does not hold the shoulder up or out and it tends to become loose and slip off the shoulder. It works fairly well in greenstick fractures of young children if reinforced with adhesive and held together in front to prevent slipping off the shoulders.

(6) A plaster jacket combined with a cast of the shoulder and arm, holding the arm in abduction, is effective if properly applied. But it is heavy and cumbersome and its satisfactory application requires considerable experience and skill in the use of plaster of Paris.

(7) Open operation may be occasionally advisable in irreducible cases, and it is the usual procedure in the infrequent cases of non-union. The facts are that open surgery is very liable to be disappointing. The scar is apt to be more disfiguring than a malunion of moderate degree. Moreover, some bone deformity often results, especially if the patient is not kept recumbent to relieve the strain and tendency to displacement when in the erect posture. This yoke dressing would be indicated here, though I have not yet used it in connection with operation, which I think is rarely indicated. The superficial position of the clavicle often causes sinus formation and sloughing of skin when plates, wire or other fixation materials are inserted.

*Advantages of the Plaster Yoke.*—It is rigid and does not slip or change its shape, thus holding the position of the shoulder and the fragments of the clavicle as when applied for any desired period.

It will positively and continuously hold the shoulder upward, backward and sufficiently outward. It gets its base of support across the upper back and on top of the shoulders near the base of the neck, thus exerting a positive backward and upward pull or support to the shoulder.

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*Read in Section on Bone and Joint Surgery, Southern Medical Association, Twenty-Fourth Annual Meeting, Louisville, Kentucky, November 11-14, 1930.

†Professor of Clinical Orthopedic Surgery, Vanderbilt University School of Medicine.

Fig. 1 (Top)—Shows application of plaster yoke dressing.

Fig. 2 (Bottom)—The finished dressing. Notice how assistant holds the arm of the affected side with the shoulder upward, backward and outward. The patient's pelvis is strapped to the chair and a small pillow or pad supports the middle of his back during the application. The plaster is carefully moulded around the base of the neck.

It permits positive downward pressure by felt pads on the outer end of the inner fragment, if desired. Moreover, the lift of the shoulder may be increased after application, if necessary, by inserting felt pads near the base of the neck or in the axilla. It is comfortable in both erect and recumbent positions if trimmed properly under the arms. It allows free use of both arms and hands. We have had no trouble from pressure on the axillary vessels and nerves. It permits the patient to dress fully without being conspicuous. It gives better cosmetic results than any method I have used except, possibly, continued recumbency. It is really not difficult to apply and the materials used are simple and inexpensive.

Padding consists of, preferably, a strip of saddler's felt ¼ to ⅜ inches thick and 3 to 6 inches wide, long enough to make a posterior figure-of-8 of the shoulders, threaded through stockinette of proper width to prevent the felt from irritating the skin. Cotton batting covered with gauze will do for the padding, but is not so satisfactory. A few plaster of Paris bandages 3 to 4 inches wide are the only other materials needed.

This dressing is usually applied with the patient sitting in a chair, though it may be done in the recumbent position, as is required when an anesthetic is used for reduction, which is occasionally necessary (see illustrations). It will be noted that the patient sits in a straight chair with low back or a pillow may be used to raise him so that the chair back does not come above the level of the lower angles of the scapulae. A pad may be placed in the middle of the

Fig. 3

Posterior view, showing ability to use the arm immediately without pain. Note the outlines of the plaster and padding.

Fig. 4

Front view, showing outlines of plaster and padding and the upward and backward position of both shoulders, especially the left one. Also notice that the plaster extends well forward over left clavicle and a felt pad holds the inner fragment down. The patient can get his hands to his pockets.

Fig. 5

Patient fully dressed and wearing plaster yoke. The left shoulder is well up and back and the hand is used to button clothing.

Fig. 6
Position on table and head rest for application in recumbency.

Fig. 7 Fig. 8
Plaster yoke dressing on a young boy. It has been cut in front of the right shoulder to permit removal and inspection of clavicle (left). The left shoulder is well up and back.

Fig. 9 Fig. 10
The dressing applied to an infant. It has been used on patients from 6 months to 65 years of age.

back for him to lean back against. It is well to tie a broad bandage around the patient's pelvis and the back of the chair to prevent his sliding out of position. A strong assistant sits in another chair at the side and by firmly grasping the arm holds the affected shoulder upward, backward and outward with this arm in about 60 degrees of abduction. The patient holds the opposite arm in about the same position by grasping some object at the side or by placing the hand on his hip with the elbow flexed.

The padding, as above described, is then applied as a posterior figure-of-8 of the shoulders, drawing it tightly enough to fit snugly under the arms. The upper edge should extend just slightly on to the neck and if the inner fragment of the clavicle is displaced upward the padding is pulled forward over this so that the finished cast will cover as much as one or two inches of this fragment and exert a downward pressure on it. This pressure may later be increased as necessary by extra pads of felt held in place by adhesive.

The plaster of Paris bandage is then applied, partly by figure-of-8 turns and partly by extra layers to reinforce the main, or yoke, portion. It should be heavy enough to give it complete rigidity, varying with the size and strength of the patient. The edge of the padding extends slightly beyond the edge of the plaster all around. The cast is trimmed rather narrow (1 to 2 inches wide) under each arm so that the patient can dress himself easily and get his good hand to his buttocks region. While the plaster is setting the cast should be moulded snugly around the base of the neck and under each arm, holding the affected shoulder well up and back as it hardens.

It will be observed that this dressing is not simply a posterior figure-of-8. It is in a true sense a yoke which carries the weight of the shoulders and thus holds the affected one in the desired position, upward, backward, and, to a sufficient degree, outward. To emphasize this idea, I have chosen to call it the "Plaster Yoke Dressing."

*426 Doctors Building*

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DISCUSSION (*Abstract*)

*Dr. F. C. Kidner, Detroit, Mich.*—Dr. Billington's plaster of Paris device for the routine treatment of

fractures of the clavicle seems to me at first sight the best that I have come across, and I shall use it at the first opportunity.

One question in regard to it that arises in my mind is as to its application in individuals with abnormally flat backs. In the round shouldered, it is easy to see how the shelf of which he speaks can be made use of successfully. In the individuals in whom the neck rises straight up from the dorsal spine, I should think there would be a tendency for the apparatus to slip downward or else to force the head forward in an uncomfortable position.

*Dr. M. Casper, Louisville, Ky.*—This is a step in the right direction.

I have seen one later device than this, not mine by any means, discovered quite by accident lately. The principle is exactly the same. It has several advantages. In the first place it is much easier to put on and lighter to the patient. He can get around and do almost anything.

The apparatus consists of leather padded strips. It goes around under the arm, very much as the cropper on a buggy horse goes under the horse's tail. It is connected by two straps in the back with buckles on it so it can be readily adjusted. Somebody has devised something very practical in this simple harness.

It is put on in a few minutes and you can adjust it day by day by moving two little buckles, straps in the back. The principle is exactly like Dr. Billington's.

There has been a great deal of exaggeration about this upward pull. The clavicle is more or less a horizontal bone and the muscles with the backward pull are relaxed. We get all that is necessary from this simple thing, all that we get in the more cumbersome and disagreeable plaster of Paris.

During the summer season plaster is heavy to carry around, quite a weight for a little girl. The apparatus which I am describing does not weigh a pound altogether. I came upon it accidentally once when all the cross splints were in use.

*Dr. W. B. Carrell, Dallas, Tex.*—Many types of apparatus have been described and most of us have used a considerable number of them. Fortunately the most careful apposition is unnecessary in fractured clavicles because recovery is good even with some overlapping. It is desirable, however, to have good position, and this is maintained best by some apparatus which will hold the shoulder upward and backward. Dr. Billington's method is neat and seems excellent and I believe we shall find it applicable to many of these cases.

*Dr. Billington (closing).*—We have used this method in only about fifteen cases, but it has been more comfortable for the patient than any appliance that I have seen, and it will actually hold the shoulder up and back. That is of major importance.

I have seen Dr. Casper's apparatus and others similar to it. It has the objection of the posterior figure-of-8 and of the cross, in that it does not hold the shoulder up. It only holds it back. This often results in a low shoulder which is objectionable, especially to women.

This dressing works well on patients with a flat back as on those with round backs. It hugs closely the sides of the base of the neck and thus gets its firm base of support on the upper thorax, which holds the shoulders upward as well as backward, continuously and positively.

# ACUTE LYMPHATIC LEUKEMIA IN CHILDHOOD: CASE REPORT WITH AUTOPSY*

*By* James H. Park, Jr., M.D.,
Houston, Tex.

The term leukemia is used to designate a disease of the blood building tissues, which leads to hyperplasia or hyperfunctioning and to the pouring forth of immature and pathological cells into the blood stream.

The first case of leukemia was reported by von Frederich in 1857. The clinical picture of leukemia was described by Ebstein in 1889. Fraenkel called special attention to the pathological changes of the blood in leukemia in 1895. Ehrlich, who discovered the differential stain of leukocytes in 1891, distinguished two types of cells in leukemia: (a) granulocytes, granular cells of bone marrow origin, which occur in myelogenous leukemia; (b) non-granular cells of lymphatic origin seen in lymphatic leukemia. This division is still the most satisfactory and is generally accepted. A third type, monocytic leukemia, as yet not well recognized, was described by Reschad and Schilling-Torgau in 1913. Since then 28 cases have been reported. The medical world has been disinclined to accept the third type as a separate entity. Even as late as 1905 the acute myeloid type was denied by most writers and observers. The view that acute leukemia was nearly always of the lymphatic type has been rejected. More careful cytological study of the blood and tissues with the use of the oxydase stain tends to show that acute myeloblastic leukemia is much more frequent than the acute lymphatic type.

While leukemia is widely distributed in the animal kingdom, it is relatively infrequent in human beings, one case occurring among approximately every 1,000 hospital admissions. Wollstein and Bartlett found out of a total of 24,546 admissions to the Babies' Hospital in New York 14 instances of acute lymphatic leukemia and 1 of myelogenous leukemia.

The disease may occur at any age, but the various types seem to occur at definite periods of life. Acute leukemia develops most often in individuals less than 25 years old; chronic myelogenous leukemia in patients between 25 and 45 years of age; chronic lymphatic leukemia in

*Read in Section on Pediatrics, Southern Medical Association, Twenty-Fourth Annual Meeting, Louisville, Kentucky, November 11-14, 1930.

those between 45 and 60 years. Wollstein and Bartlett found that the age of the infants with lymphatic leukemia, observed at the Babies' Hospital, ranged between 10 months and 4 years; the age of the only case of myelogenous leukemia was 2½ years. Males are more subject to the disease than females. There is no proof that leukemia is familial; the cause of leukemia is unknown.

In both chronic lymphatic leukemia and myeloid leukemia there is a marked rise in basal metabolism, the average increase being between 40 and 50 per cent. The cause of the increase is uncertain; some believe it is due to the active metabolism of large numbers of immature white cells which require an increased quantity of oxygen.

The blood during both acute and chronic myeloid leukemia has been shown to contain a proteolytic ferment, which cannot be found in lymphatic leukemia. Oxidizing ferments are present in the polymorphonuclear leukocytes, myelocytes, and generally in the myeloblasts. They have never been demonstrated in lymphocytes.

Acute lymphatic leukemia is characterized by progressive anemia frequently associated with a tendency to hemorrhages in various parts of the body. Less commonly is the hemorrhage manifested in the form of hematemesis or hematuria. There is usually, but not always, general enlargement of the superficial glands, which are often painful; some increase in the size of the liver and spleen; occasionally the kidneys can be palpated. The onset is somewhat indefinite, the history denoting increasing pallor and languor for some weeks; and the duration dating from the first illness observed varies from a few days in the most acute cases to 3 or 4 months in the more prolonged cases. Examination of the blood provides the only satisfactory means of diagnosis and yields a picture differing fundamentally from that presented by other blood diseases. The chief distinction lies in the existence of a condition of absolute or relative lymphocytosis. The variation in the total number of leukocytes is often considerable, ranging from below 10,000 to more than 100,000. Counts of 1,000,000 white blood cells have been recorded. A leukopenia may exist; but whatever the total leukocyte count may be, there is invariably an absolute or relative increase in the number of lymphocytes. At the same time there occurs a diminution in the number of red blood cells to between 500,000 and 3,000,000 and a variation in the percentage of hemoglobin yielding a color index above or below normal. Minot and Buckman studied the blood platelets in the leukemias and found that in chronic myelogenous leukemia the numbers of these elements may be normal, enormously increased, or greatly diminished; and in chronic lymphatic leukemia and acute leukemia it is a rule to find them below normal.

The temperature is irregularly raised, but in the more prolonged cases, during temporary improvement, falls to normal. The urine frequently contains a trace of albumin and occasionally casts. Hematuria rarely occurs. During the course of the illness the condition of the glands, spleen and liver may alter considerably, at one time increasing, at another time decreasing in size. A decrease in size is common during periods of temporary improvement and shortly before death. Severe hemorrhages from the mucous membranes of the nose, throat and alimentary tract are not uncommon towards the end. Coincident with the downward progress of the case, there is increasing pallor and loss of strength. The red blood count may fall to 500,000 per cubic millimeter and the leukocytes to less than 10,000. In a case reported by Wollstein and Bartlett, the total number of leukocytes were 57,000 on admission and dropped to 10,000 cells on the following day. A leukopenia developed reaching a minimum of 2,500 cells, which persisted during most of the patient's stay in the hospital; there was a terminal increase to 21,150 leukocytes on the day she died. She was in the hospital for the greater part of six weeks.

Post mortem examination verifies the slight enlargement of the superficial lymph nodes observed during life and in addition there is usually found an increase in the size of and hemorrhage into the mesenteric and retroperitoneal lymph nodes. The heart is dilated with scattered hemorrhages on the epicardial and endocardial surfaces. Sub-pleural and pulmonary hemorrhages may also be present. The liver and spleen show some enlargement, the former being extremely pale. The kidneys are, as a rule, enlarged; they show a very pale surface extensively mottled with hemorrhage, which may involve the whole cortex and destroy the line of demarcation between cortex and medulla. The extreme yellow pallor of the pyramids forms a strong contrast. The stomach and intestines show no ulceration, but frequently contain blood and display a very marked submucous hemorrhage. Peyer's patches are invariably much

swollen; the bones show no changes; the marrow is seldom increased in amount and its color varies from dark to pale red. Extensive hemorrhage may be found underlying the dura mater. Microscopical examination shows considerable hyperplasia of lymphocytes in the adenoid tissue and bone marrow and lymphocytic invasion of the spleen pulp and portal canals of the liver and the interstitial tissue of the kidneys, heart and pancreas.

### DIFFERENTIAL DIAGNOSIS OF ACUTE LYMPHATIC LEUKEMIA

There are many diseases which simulate lymphatic leukemia, notably, acute infectious mononucleosis, agranulocytosis, scurvy, ulcerative stomatitis, pertussis, quinsy, diphtheria, gumma of the tonsil, sepsis, endocarditis, tuberculosis of lymph nodes, pseudo-leukemia, pernicious anemia, hemorrhagic diathesis, purpura hemorrhagica, so-called acute monocytic leukemia, and acute myeloid leukemia; the latter is the one most often confused with acute lymphatic leukemia. Clinically they are identical. The blood provides the most certain means of differentiation:

| | Acute Myeloid Leukemia | Acute Lymphoid Leukemia |
|---|---|---|
| Myeloblasts | 11 | 0 |
| Premyelocytes | 11 | 0 |
| Myelocytes | 11 | A few or 0 |
| Eosinophils | Rarely | A few or 0 |
| Basophils | Rarely | A few or 0 |
| Lymphocytes | A few or 0 | 11 |
| Oxydase test | 1 | 0 |

The final diagnosis may be only possible by histologic study of the tissues.

### REPORT OF A CASE

W. C., a boy of 6 years, from Baytown, Texas, was admitted to Hermann Hospital, at 7:00 p.m. May 8, 1930, in a state of coma. The temperature was 101.8° F. by rectum, pulse 106, respiration 46. He was delivered at full time and was apparently normal at birth. There was nothing unusual in his feeding history. The family history was essentially negative. The past history was negative save for mumps at 2 years of age.

The child was apparently well until 3 days before admission to the hospital, when he complained of feeling tired and would not play. He was given 2 grains of calomel, followed by castor oil, during the next 2 days. There was no improvement in his condition, so a physician was called. At that time his abdomen was noticeably enlarged and he complained of generalized pain in the abdomen. Quinine treatment was instituted upon the belief that the child had malaria because of an enlargement of the spleen. His condition became progressively worse and at noon of May 8, 1930, he became unconscious and remained so. The illness was not ushered in by a chill, nor was there any gastro-

Fig. 1
Section of liver showing infiltration with lymphocytes between liver cells and around central vein.

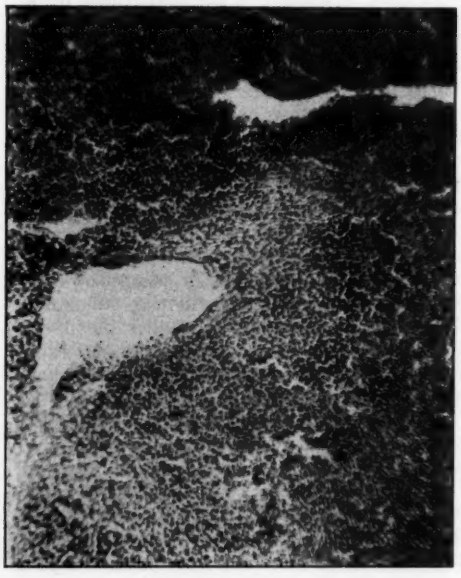

Fig. 2
Section of spleen.

intestinal disturbance until after admission to the hospital, when he vomited bile and retched continuously. Pain in the abdomen, constipation, fever, loss of appetite and stupor were the outstanding features of the illness prior to admission to the hospital. The temperature of the patient had not been observed, but the parents were of the opinion that he had had fever since the beginning of the illness. With the onset of coma another physician was called, who advised that the child be sent to Houston for observation and treatment.

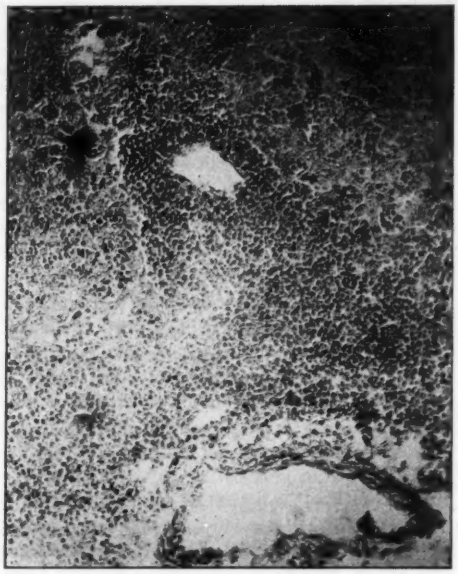

Fig. 3
Section of liver showing mass of lymphocytes within portal vein and around bile duct.

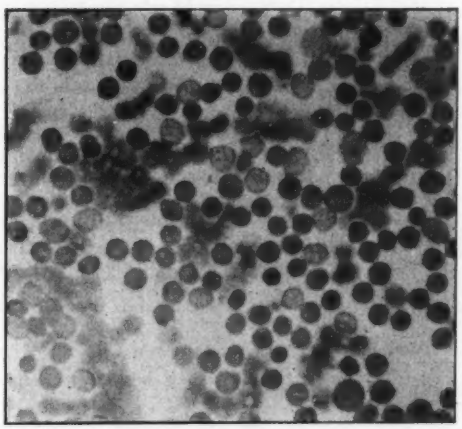

Fig. 4
Blood film—acute lymphatic leukemia.

Physical examination revealed a well nourished white male child, 6 years of age, in a state of coma. The pupils were equal and reacted to light and accommodation. The ear drums were normal. The nose and throat revealed no abnormalities. The teeth were in fairly good condition. The tongue was dry and coated. The mucous membranes of the mouth were dry and pale. The chest expansion was equal and normal. Respiratory rate, 46 per minute. The lungs revealed no dullness, but the breathing was of the bronchovesicular type over both lower lobes. The pulse rates were equal, regular and full, rate 106 per minute; no heart murmurs were present. There were no heart irregularities. The apex beat was in the nipple line in the fourth interspace. There was slight cardiac enlargement to the right. Blood pressure was 114/40. The abdomen was markedly distended and tympanitic; no fluid wave was demonstrable. There were no superficial scars present. The spleen was palpated 5 fingers' breadth below the left costal margin, reaching to the midline anteriorly and to the postaxillary line posteriorly. The lower border of the liver extended 4 fingers' breadth below the right costal margin, blending with the splenic tumor anteriorly. The liver and spleen were smooth with firm edges. The genitalia were negative. The rectal examination was negative. The skin was dry and pallid. There was no general enlargement of the superficial lymph nodes. The superficial reflexes were dulled.

The patient's condition became rapidly worse, death occurring at midnight, at which time the rectal temperature was 106.2° F.

LABORATORY DATA

The catheterized specimen of urine contained one plus albumin and a trace of acetone; it was otherwise negative.

Routine blood studies furnished striking observations:

| | |
|---|---|
| Erythrocytes | 2,600,000 per cu. mm. |
| Hemoglobin | 40 per cent (Sahli) |
| Leukocytes | 304,000 per cu. mm. |

A differential count of 1,000 leukocytes, stained by Wright's method, was made. The count revealed:

| | |
|---|---|
| 882 lymphocytes | 88.2 per cent |
| 1 transitional leukocyte | 0.1 per cent |
| 1 polymorphonuclear neutrophile | 0.1 per cent |
| 116 "degenerative" forms | 11.6 per cent |

As each oil immersion field in thin parts of the smear contained cells, the study of the entire slide was of greater interest than the mere percentages. In the entire smear 1 or 2 transitional cells and an occasional polymorphonuclear neutrophil were observed, but no myelocytes were seen. No normal large lymphocytes were seen. One or two normal small lymphocytes were present; the remaining lymphocytes were atypical. Their size varied from 7.5 microns to 9 microns; the nuclei were less densely stained than usual, coarsely reticulated and so large as to fill the cell in the majority of instances. In a few cells a narrow rim of clear bluish cytoplasm was present.

The cells listed as "degenerative" forms were unlike any of the normal constituents of blood and varied

from 9 to 14 microns in diameter; were rounded but irregular in outline; many showed wrinkling of the periphery. They presented a coarse neutrophilic or slight eosinophilic reticulum, which appeared to cover, rather than to occupy, the cell, and presented a sharply defined edge to the cell body. No nucleus was distinguishable; in or near the center of each cell was a small clear spot, intensely blue, and about 2 microns in diameter. The cells were a striking feature of the stained preparation; they probably represented degenerative lymphocytes and the reticulum was interpreted as nuclear debris altered by karyolysis. No similar cells were found in the sections of the tissue examined.

Careful study of the entire smear showed 1 or 2 dense isolated nuclear masses thought to be erythroblastic; otherwise the red cells presented no abnormality. In the entire smear very few platelets were to be found, not more than 1,000 to 2,000 white cells, nor were there any clumps of platelets. A blood platelet count was not made.

## COMMENT

On account of the fulminating nature of the patient's illness and the brief time allowed for observation of the disease, a study of the spinal fluid and further studies on the blood, especially the chemistry of the latter, were not obtained. Because of the high white blood count, marked lymphocytosis, enormous reduction of the red blood cells and hemoglobin, with marked enlargement of the liver and spleen, a diagnosis of acute lymphatic leukemia was made. Myelogenous leukemia could be ruled out by a study of the blood. In no way did the type cell resemble myeloid cells. There was a complete absence of basophils and eosinophils. The so-called monocytic leukemia, likewise, could be ruled out due to an absence of the typical cell of that disease, the monocyte (endothelial leukocyte of Mallory).

A partial autopsy was granted, permission being given to open the abdomen and to remove the liver and spleen.

## AUTOPSY FINDINGS

The autopsy was performed on the embalmed body. The abdomen was opened; the liver and spleen were removed. The remaining abdominal organs were examined by palpation as well as conditions permitted.

(1) *Gross.*—(a) The liver was uniformly enlarged; weight 1,120 grams. The contour was normal, consistence and color approximately normal, capsule thin. The gall bladder was normal.

(b) The spleen was much enlarged; weight 658 grams. Its contour was normal, the capsule thin, cut section homogeneous in appearance and of the color of normal liver tissue.

(c) *Lymph Nodes.*—The preaortic glands were moderately enlarged. The main group of mesenteric lymph nodes at the root of the mesentery were considerably enlarged; the intermediate and juxta-intestinal groups were normal. All nodes were discrete, soft, white, homogeneous, with thin capsules and no fibrosis nor caseation.

The remaining abdominal organs were normal to palpation and superficial inspection.

(2) *Microscopical Study of Organs Removed.*—(a) In the liver there was diffuse infiltration with small lymphocytes so closely packed as to obscure the hepatic tissue. The portal canals were densely infiltrated, and there was similar massing of lymphocytes immediately surrounding the central vein. The capillaries contained rows of small lymphocytes. The hepatic cells showed moderate cloudy swelling and slight fatty degeneration; the bile ducts were normal, though almost hidden by lymphocytes. The endothelium of the vessels appeared normal. There was no bile pigment.

(b) *Spleen.*—The section showed lymphocytes uniformly distributed; amid these, remnants of fibrous trabeculae, reticular tissue and endothelial cells were found with difficulty. There was no trace of malpighian bodies; some of the larger vessels contained blood which was so overloaded with lymphocytes that it was recognized with difficulty. A very few red cells were to be distinguished in the splenic pulp. There was no hematogenous pigment demonstrable in the hematoxylineosin preparation.

## SUMMARY

The leukemias, in general, and the acute lymphatic type in particular, have been discussed.

A case of acute lymphatic leukemia, unusual in many respects, occurring in a male child, has been reported.

The unusual features of the case were the sudden onset, fulminating character of the disease, absence of generalized superficial adenopathy and lack of hemorrhagic manifestations.

I am indebted to Dr. Violet Keiller, Pathologist to Hermann Hospital, Houston, Texas, for the blood study and autopsy findings.

## BIBLIOGRAPHY

Ebstein, W.: Ueber die acute leukemie und pseudo leukaemie deutsch. Archiv. Fur Klim. Med., 44:343, 1889.

Ehrlich, P.: Farhenanalytische Untersuchungen zur Histologie und Klinik des Blutes, Berlin, 1891. A. Hirschwald.

Forbes, J. G.; and Langmead, F. S.: Fatal Lymphocythemia in Early Life. Proc. Roy. Soc. of Med., Clin. Sect., London, April, 1908.

Fraenkel, A.: Ueber acute leukemie, deutsch. Med. Wchnschr., 21:639, 1895.

Minot, George R.; and Buckman, Thomas E.: The Blood Platelets in the Leukemias. Amer. Jour. of Med. Sci., 169:477-485, 1925.

Ordway, T.; and Gorham, L. W.: The Leukemias, Cecil's Practice of Medicine, p. 933. W. B. Saunders Co., 1927.

Pinkus, F.: Acute Lymphatic Leukemia in Nothnagel. Encyclopedia of Practical Medicine (American Edition), p. 544. Philadelphia: W. B. Saunders Co.

Reschad, H.; and Schilling-Torgau, V.: (Quoted by Dameshek, William, Archives of Internal Medicine, 46: 718, Oct., 1930.) Ueber eine neue Leukamie durch echte Uebergangsformen (Splenczytenleukamie) und ihre Bedeutung fur die Selbstandigkeit dieser Zellen, Munchen. med. Wchnschr., 60:198, Sept. 9, 1913.

Schleip and Alder: Atlas der Blutkrankheiten—2 auflage. Urban and Schwarzenberg, Berlin-Wein, 1928.

Von Friederich, N.: Ein neurer fall von leukaemie, virch. Archiv. F., Path. Anat. U. Phys., 12:37, 1857.

Wollstein, Martha; and Bartlett, Frederick H.: Lymphatic Leukemia in Infancy with the Report of a Case. Amer. Jour. Med. Sci., 169:819-830, 1925.

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## DISCUSSION (*Abstract*)

*Dr. John A. Lanford, New Orleans, La.*—The differential point of diagnosis in these cases sometimes rests entirely, from the blood-picture standpoint, on the presence or absence of the oxydase reaction. With the very young cells occurring in the acute leukemic conditions it is very difficult, using the ordinary Wright's stain, to determine just what they are, whether of the myeloblastic type or the lymphoblastic type. By the use of the oxydase stain, however, we can determine the presence or the absence of the characteristic granules.

Acute lymphatic leukemia is possibly more commonly seen in children than it is in adults, but its course is about as rapid. However, in adults it is usually ushered in by a gingivitis and stomatitis, with hemorrhage from the mucous membranes generally. Blood study made incidental to the clinical study of the case is usually the first definite information that the clinician obtains. In children it is more or less the same.

To illustrate the extreme difficulty of diagnosing or separating the two types of acute leukemias, I will report a case we have just studied at our institution, Touro Infirmary. This was a man whose white blood count, three weeks previously, was less than 9,000. He became ill with some apparently mild infectious condition and was brought to the institution, where a blood count was made, which showed around 70,000 cells, most of them of the mononuclear type, but it was not possible to determine by ordinary stain whether they were of the myelogenous or lymphatic series. This serious condition progressed quite rapidly, and we were able to determine by means of the oxydase test that this was a case of acute myelogenous leukemia, although previous to that test the clinician was inclined to veer over to the lymphatic side.

One of the most interesting autopsy findings in this case was the bone marrow. The color was more or less of a pinkish to reddish type, not red as is seen in primary anemia, nor the creamy red as in lymphatic leukemia, but more yellowish. The absence of fat in the marrow was particularly striking.

This man only three weeks previously was apparently a healthy individual and yet died within three weeks from an acute myelogenous leukemia which, in my experience, is the rarer of the acute leukemias.

*Dr. Park (closing).*—There is no doubt in the minds of many that there can be and is a third type of leukemia, the monocytic. It is maintained that if there are three types of white blood cells, namely, granular and non-granular or lymphocytic and monocytic, there can be and is a third type of leukemia. It is contended that the monocyte is derived from the reticulo-endothelial system, and is found in the stroma of the spleen, lymph nodes, bone marrow, and intestine and lining the sinusoids of the spleen, liver, lymph nodes and bone marrow. The recognition of the disease depends upon the recognition of the type cell, the monocyte. An interesting and comprehensive article on the subject by William Dameshek appeared in the October, 1930, issue of the *Archives of Internal Medicine*.

# RENAL CALCULI FOLLOWING FRACTURE OF THE SPINE*

*By* S. WALLENSTEIN, M.D., F.A.C.S.,†
Baltimore, Md.

*Case 368-8214.*—H. G., aged twenty-three, married, a laborer, was admitted to the West Baltimore General Hospital on April 20, 1928, as an emergency case.

On admission, he was obviously in shock. The pupils were dilated and reacted sluggishly to light and accommodation. His body was moist with perspiration. There was a mass in the region of the first lumbar vertebra. There was complete loss of motor and sensory power of both limbs. There was absence of deep and superficial reflexes, loss of bladder and rectal control, and absence of abdominal reflexes. There was no previous history of retention or incontinence.

The findings of the injury to the cord in the region of the first lumbar vertebra were corroborated by Dr. H. E. Ashbury. The x-ray report was: crushing fracture of the first lumbar vertebra, with no marked displacement of fragments.

Operation was performed eight hours after the injury by Dr. Charles Bagley, Jr. Under local anesthesia a laminectomy of the twelfth dorsal and second lumbar vertebra was done. Small fragments of bone pressing on the cord were removed. The subdural canal was found filled with bloody cerebrospinal fluid above the fracture.

*Postoperative Course.*—The bladder gradually distended to the umbilicus; there was excruciating pain over the bladder. Morphia, hot rectal douches, hot irrigations did not relieve the pain. Suprapubic cystotomy was advised and refused. Therefore, fourteen hours from the time of the injury he was catheterized by the drop method and 1,200 c. c. of urine were obtained. He was then catheterized regularly every eight hours. On the fourth day a retention catheter was inserted and warm normal salt irrigations followed by 10 per cent argyrol were used three times daily.

The catheter was removed every week and the ability to void was tested. The bladder capacity varied from 25 c. c. at first to 200 c. c. at the end of the eighth week, when the catheter was removed and he voided. There was some dribbling between the voidings for several weeks.

Renal calculi were predicted early in this case and were found. X-ray of the genito-urinary tract on June 5, 1928, five weeks after the injury, showed a shadow 0.5 x 0.5 cm. in the region of the pelvis of the right kidney. This was probably a renal calculus.

*Rectal Involvement.*—The bowels required as much care as the bladder. There was marked distention and constipation. Medicated enemas, turpentine stupes, and pituitrin were used freely during the first three weeks. The bowels required less attention thereafter.

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*Read before the Baltimore City Medical Society, November 2, 1929.

*Received for publication February 8, 1931.

†Chief of Service, Department of Urology, West Baltimore General Hospital; Attending Genitourinary Surgeon, Mt. Pleasant Sanatorium; Associate Attending Genitourinary Surgeon, Sinai Hospital.

*Sexual Powers.*—Desire and ability were present in the eighth week.

*Hyperhidrosis.*—Aside from the initial perspiration due to shock accompanying the injury there was no hyperhidrosis. There were no trophic ulcers.

General massage of the body, also faradic stimulation, particularly over the lower limbs and the hypogastric region, were started in the second week and continued to the day of discharge. Six weeks after operation the patient was out of bed walking with crutches. On July 3 he was discharged with orders to return after two weeks for bladder treatment.

He was readmitted July 12-31, 1928, with right renal colic. The x-ray department reported on July 12 two oblique shadows 1.5 x 1 cm. on either side of the pelvis in the course of the ureters, close to the bladder, suggesting ureteral calculi.

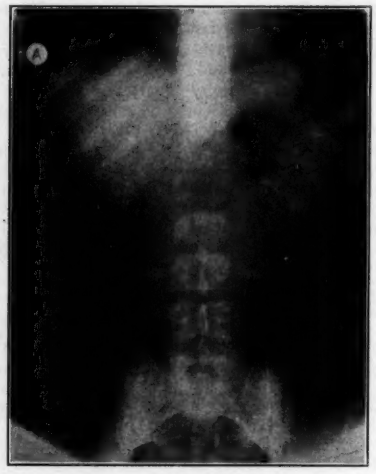

Fig. 1
X-ray of spine; crushing fracture of first lumbar vertebra.

*Cystoscopy.*—The external sphincter was spastic, the posterior urethra dilated, the ureteral orifices were normal, trabeculations were present. Vasomotor changes, characterized by areas of venous congestion were seen all over the bladder wall. The bladder contained 200 c. c. There was no obstruction to a No. 8 ureteral catheter on either side. A pyelogram of the right kidney showed a dilated renal pelvis. The ureter was dilated and had a serrated border and a filling defect just above the bladder produced by the calculus. The ureter was dilated by means of two No. 8 catheters passed to the pelvis. The pelvis was washed with 0.5 per cent silver nitrate. He was again admitted August 2-26, 1928, with pain in the left lumbar region. The left ureter was dilated with two No. 8 ureteral catheters and the pelvis was washed once every week. By means of manipulation with ureteral catheters the right ureteral calculus was removed on August 9, 1928, and the left ureteral calculus passed after dilatation on August 17. The fourth admission was from October 23-November 2, 1928. This time the patient was admitted for the purpose of dilating the ureters and washing the pelvis of each kidney with 0.5 per cent silver nitrate.

*Comment.*—The skillful operation performed by Dr. Charles Bagley, Jr., relieved the pressure on the cord and the patient made a striking improvement. He now walks with braces on his feet and drives a car. His sensations have returned in all but the lower third of both legs. There is loss of power below the knees. The knee jerks are absent on the left and sluggish on the right, but knee jerks are last to return.

## DISCUSSION

The care of the urinary tract in injuries of the spine is attended with great difficulty. Opinion is still divided as to the best method of procedure. Besley and his followers for years have been treating these cases by a non-operative treatment, allowing the bladder to distend until finally it overflows. In the "Manual of

Fig. 2-A Fig. 2-B Fig. 2-C
Migration of renal calculi.

Military Urology" this rule was followed where the transverse lesion was complete. In the French Army it had been made a rule that all of these patients have a prompt suprapubic cystotomy. This was done also in the British Army without waiting to catheterize. Experimental studies by Curtis with complete sections of the cord creating paralysis of the bladder revealed that failure to catheterize the paralyzed bladder is followed by back pressure of urine which is exceedingly destructive to kidney tissue. Associated urinary infection is frequent. McClintic, in a recent study of the neuro-physiology of the automatic urinary bladder, points out that an incomplete transverse lesion is never associated with an automatic bladder; a complete transverse lesion, however, always results in an automatic bladder. Schachner claims that, although the location of the injury in the majority of cases can be determined with reasonable certainty, the nature and extent of the injury to the cord is a difficult matter to determine. The clinical data may be so misleading that we may not be able to ascertain with reasonable certainty whether we have a destructive lesion with anatomic cord changes or whether we have a case simulating a destructive lesion, but which will clear up with time. Complete loss of sensation, absent reflexes, especially the knee jerks, paralysis of bladder and rectum, and vasomotor paralysis point to a complete transverse lesion. Any variation in this symptomatic picture points to an incomplete rather than a complete transverse cord lesion.

LABORATORY FINDINGS

| FIRST ADMISSION | | | | SECOND | | | | THIRD | | FOURTH | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | 4/21 | 5/3 | 5/29 | 7/12 | 7/13 | 7/16 | 7/18 | 8/2 | 8/9 | 10/24 | /26 | /31 |
| Reac | AC | ALK | ALK | AC | AC | ALK | ALK | AC | AC | ALK | AC | AC |
| S.G. | '31 | '10 | '10 | '15 | '02 | '13 | '02 | '10 | '05 | '15 | '14 | '19 |
| Alb. | XX | TR | X | XX | X | XXX | X | XX | XX | X | TR | X |
| Sug. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ace. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| D.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cast | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Epit | 0 | 0 | 08 | 0 | 0 | 0C | 0C | 0 | 0 | 0C | 0 | 0 |
| P.C. | 0C | 0C | XX | XX | XXX | XXX | XX | XX | X | X | X | X |
| B.C. | 0C | 0C | 0 | 0 | 0 | 0 | 0C | 0C | 0 | 0C | 0 | 0C |
| Bact | XX | XX | XX | XX | B.CLI HEAVY GROWTH | | | XX | | XXX | XX | XX |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hmb. | 75 Per cent | | | 79 Perct | | | 80 Perct | | | 84 Perct | | |
| Eryt | 3,000,250 | | | 3,240,000 | | | 3,310,000 | 3,690,000 | | 3,780,000 | | 4,860,000 |
| L. | 13,250 | | | 13,400 | | | 16,400 | 10,000 | | 11,750 | | 9,250 |
| S.L. | 4% | | | 4% | | | 8% | 12% | | 13% | | 10% |
| L.L. | 3 | | | 4 | | | 4 | 1 | | 1 | | 4 |
| L.M. | 2 | | | 6 | | | 8 | 8 | | 0 | | 3 |
| Tran | 0 | | | 2 | | | 5 | 1 | | 0 | | 5 |
| Eosi | 0 | | | 0 | | | 0 | 0 | | 0 | | 1 |
| P.N. | 91 | | | 84 | | | 75 | 78 | | 86 | | 69 |
| U.N. | 13.6 | 13.6 | | 12.9 | | | | 12.0 | | 10.3 | | |
| U. | 29.1 | 29.1 | | 27.8 | | | | 25.6 | | 22.4 | | |
| Crea | 2.0 | not done | | not done | | | | not done | | 1.6 | | |
| Phth | 130 | | | 50 | | | | 180 | | 230 | | |
| | 20% | | | 5% | | | | 20% | | 40% | | |
| | 270 | | | 90 | | | | 100 | | not obtained | | |
| | 25% | | | 25% | | | | 20% | | | | |

Chart 1
Laboratory Findings

## CONCLUSION

My conclusion, then, is that a suprapubic cystotomy is indicated and is probably the best method of procedure in incomplete as well as in complete transverse lesions of the cord, as stasis and infection are both done away with.

The wonderful functional results following operations on the spine are often vitiated by insufficient urological care, for about 80 per cent of patients die of urinary infection.

## SUMMARY

R. G., a white laborer, aged twenty-three, fell from a height of 35 feet, causing fracture of the first lumbar vertebra. Laminectomy was performed. There was urinary retention and marked pain. Suprapubic cystotomy was advised but refused. Renal calculi were predicted early and corroborated five weeks after the spinal injury. Two ureteral calculi 1.5 x 1.00 cm. each were removed by manipulation through the cystoscope. The patient is doing well. His sex powers have returned completely, there is no urinary disturbance, he walks with the aid of braces, and drives a car. The literature is briefly reviewed.

## REFERENCES

1. Besley, Frederic A.: A Plea for the Non-Catheterization of the Urinary Bladder. J.A.M.A., 79:638-639, 1917.
2. Boyd, Montague L.: Suprapubic Cystotomy in Bladder Paraysis. Jour. Urol., 18:413, Oct., 1927.
3. Cobb, Stanley; and Coleman, C. C.: The Course of Recovery Following Trauma of the Spinal Cord. Arch. Surg., 3:132-139, 1921.
4. Corner: A Contribution to the Pathology of the Sphincters. Ann. Surg., 34:456, 1901.

5. Curtis, Arthur H.: A Study of Bladder Function. Surg., Gyn. & Obst., 29:24-27, 1919.
6. Elsberg, Charles A.: The Frequency and Character of Bladder Disturbance in New Growths of the Spinal Cord. Ann. Surg., 84:509-516, 1926.
7. Esau: Exfoliation of Bladder Mucosa After Wound of Cord. Ztschr. F. Urolog. Chir., Berl., 8:63, 1921.
8. Guiteras: Urology, 1:255.
9. Head, H.; and Riddoch, G.: Automatic Bladder, Excessive Sweating and Other Reflex Conditions in Gross Injuries of Spinal Cord. Brain, Lond., 40:188, 1917.
10. Kanavel, A. B.: Old Injuries of the Spinal Cord. Surg., Gyn. & Obst., pp. 601-608, June, 1918.
11. Kidd, F.: Treatment of Bladder in Gunshot Injuries of Spinal Cord. Brit. Med. Jour., 1:397, 1919.
12. Manual of Military Urology.
13. McClintic, C. F.: The Clinical Neuro-Physiology of the Automatic Urinary Bladder in Enuresis. Jour. Urol., 20:267, Sept., 1928.
14. O'Conner, Vincent J.: Urological Complication Following Fracture of the Spine. Jour. Urol., 19:721, June, 1928.
15. Plaggemeyer, H. W.: Shell Fracture of the Spine with Observations on Kidney and Bladder Function. J.A.M.A., 73:1599-1606, 1919.
16. Plaggemeyer, H. W.: Observations on Certain Relations Between Shell Fracture of the Spine and Changes in Kidney and Bladder Function. Jour. Urol., 3:367-406, 1919.
17. Plaggemeyer, H. W.: Final Report on Fractures of the Spine in Relation to Changes in Kidney and Bladder Functions. Jour. Urol., 6:183-193, 1921.
18. Schachner, A.: Injuries of the Spinal Cord. Surg., Gyn. & Obst., pp. 706-712, June, 1916.
19. Walker, Thomson: Ann. Surg., p. 577, 1910.
20. Walker, Thomson: Bladder in Injuries of Spinal Cord. Lancet, Lond., 1:173.
21. Wertheimer, P.: Early Suprapubic Cystostomy in Injury of Spinal Cord. Lyon Chir., 21:309-315, 1924.
22. Winslow, Randolph: Complete Transverse Destruction of the Spinal Cord from Pistol Wound, without Penetration of the Spinal Canal. Tr. Sou. Surg. & Gynec. Ass'n., 1910.
23. Young's Urology, 2:695.

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# A STUDY OF EPIDEMIC MENINGITIS IN MISSOURI: EPIDEMIOLOGICAL AND ADMINISTRATIVE CONSIDERATIONS*

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Epidemic meningitis is a spectacular and terrifying disease commanding a position in the estimation of the public which is totally at variance with its actual importance as revealed by the morbidity and mortality statistics. Communities which accept a high incidence of typhoid fever or malaria with perfect equanimity, with a resulting mortality far in excess of what might be expected from the usual outbreak of epidemic meningitis, are aroused by a single sporadic case of this disease and demand that health officials, both local and state, do something about it. Furthermore, they expect something tangible, preferably spectacular, and since, after all, "the will of the people is the supreme law," the health officer must sometimes produce the theatrical effect demanded. To the health official faced by such a situation, the carrier survey supplies the demands of the public for tangible and, to them, spectacular measures and, in using the carrier survey, he transfers the major part of the administrative responsibility to the laboratory. As expressed by Smith:[1]

"The making of routine contact cultures constitutes a gesture—just something being done so that somebody will feel satisfied that something is being done."

The bacteriologist then becomes the scapegoat if the outbreak assumes serious proportions.

The culturing of the nasopharynx for the presence of the meningococcus constitutes one of the most exacting and delicate procedures which the bacteriologist in public health work is called upon to do and it is not, therefore, an examination which lends itself to the wholesale carrier survey. In the rush and flurry which usually accompanies such measures, efficiency is sacrificed to administrative expediency and the results obtained distort the epidemiological picture to such an extent that the administrative officer is confused rather than assisted. Recent observations have also called to our attention certain other obstacles to the advantageous use of carrier surveys. Branham[2] has reported organisms isolated from the spinal fluid of cases of meningitis which were not, culturally or serologically, typical meningococci. Smith[3] reports an organism isolated from spinal fluids in an epidemic which would not agglutinate with polyvalent anti-meningococcus serum and similar organisms were not isolated from the nasopharynx of contacts. The writer has encountered strains of the meningococcus isolated from the spinal fluids of cases which did not agglutinate with the specific antiserum. In one instance the organism was found to agglutinate after several transfers on artificial media and in another instance agglutination never occurred. Such experiences tend further to impair our estimate of the value of the carrier survey, and it should be remembered that at best it is only applicable to groups living under conditions of close association such as exist in military organizations, boarding schools and similar institutions. It does not admit of a satisfactory application in residential populations.

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Those who have had experience in the control of epidemic meningitis are not agreed upon the value of many control measures employed or upon the significance of the presence of meningococcus carriers in a group of individuals. For example: Mink[4] states that

"It is not the intention to maintain that carriers do not transmit the disease, but it is maintained that to combat the disease by the removal and segregation of carriers is absolutely impossible."

Again, Glover,[5] of the Medical Research Council of Great Britain, asserts that when the known contact carrier rate reaches 20 per cent it is a sure storm signal and any further increase should be considered a warning; while Mink states:

"We have found barracks in which meningitis developed which contained 8 or 9 per cent of carriers. On the other hand, we have found barracks in which no meningitis developed which contained 25 or 30 per cent of carriers. In instances in which a large percentage of carriers were found, carriers were removed, and in other instances carriers were left in the barracks. New cases failed to develop in both instances." So, as McCoy[6] stated: "The one measure on which every one agrees is that the person suffering from the disease should be isolated."

Intensive, rather than extensive bacteriological and epidemiological studies of close contacts and cases of epidemic meningitis appear desirable, if we are to extend our knowledge of the factors involved in the transmission of the disease and the significance of the carrier condition.

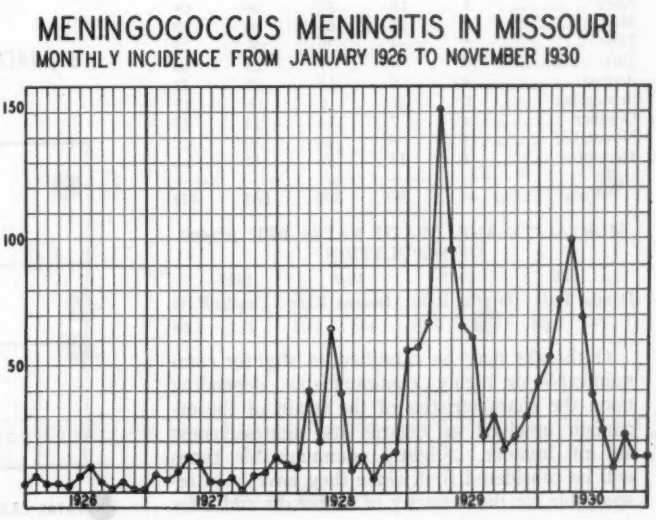
One may well ask, why the chaotic mass of experience and opinions cited above? It seems probable that the problem involves certain delicately balanced variables which cannot be evaluated on the basis of our present knowledge of the subject and with the methods now at our command. Such a situation undoubtedly exists with regard to the principles of immunity and infection in epidemic meningitis.

Perhaps a brief summary of the factors involved in the transmission of disease may not be amiss before considering specific problems and situations. Whether or not an individual succumbs to the invasion of a specific pathogen depends on the virulence of the strain of the organism involved, their number, and the resistance of the individual.

Virulence involves, first, the aggressiveness of the strain of the organism in overcoming the defensive mechanism of the body and invading the deeper tissues; second, the severity of the symptoms produced when such an invasion has been accomplished. With most pathogenic bacteria, these two factors are closely correlated, but the meningococcus offers some exception to this rule in that a low degree of aggressiveness seems to be the rule and even the poorest invaders possess an appalling degree of fury when they have, by chance, been able to establish themselves in the deeper tissues of the body.

The number of organisms involved in an infection is of considerable importance, since an individual may be able to defend himself against the attack of a few poor invaders, but will succumb to the attacks of a larger number of these same organisms.

General resistance also plays a vital part in combating the attack of organisms of slight aggressiveness. Case histories studied during the past three years have shown, in most instances, that influenza and upper respiratory infections, otitis media, extreme fatigue, excessive use of alcohol and similar conditions were the predisposing causes which lowered the general resistance of the individual to the point where heavy infections of the meningococcus were able to consummate a successful invasion of the body.



This conclusion is strengthened by the observation of outbreaks in which it was demonstrated that the person in good health does not possess an effective defense against those comparatively rare strains of the meningococcus which are highly aggressive invaders.

With these theoretical considerations in mind, we may proceed to a consideration of the situation which has existed in Missouri and present selected outbreaks which appear to offer some information as to the obscure factors involved in the transmission of the disease.

The incidence of epidemic meningitis in Missouri during the past few years has shown the same general trend observed in the tabulations for the Federal Registration Area with the same increasing prevalence and the same seasonal peaks. It is worthy of note that cities of 75,000 or over, comprising approximately one-third of the population of the State, have reported a little over three times as many cases of the disease as were reported in the other two-thirds of the population residing in the smaller cities and rural sections of the State. The incidence of the disease is illustrated by the accompanying graph, based upon the cases reported to the State Board of Health, by months.

EPIDEMIC MENINGITIS REPORTED TO THE STATE BOARD OF HEALTH

| | 1926 | 1927 | 1928 | 1929 | 1930 |
|---|---|---|---|---|---|
| January | 3 | 7 | 11 | 57 | 53 |
| February | 6 | 5 | 10 | 67 | 76 |
| March | 3 | 8 | 40 | 151 | 99 |
| April | 3 | 14 | 20 | 96 | 69 |
| May | 2 | 12 | 65 | 66 | 38 |
| June | 6 | 4 | 39 | 61 | 24 |
| July | 10 | 4 | 9 | 22 | 10 |
| August | 4 | 6 | 14 | 30 | 22 |
| September | 1 | 1 | 6 | 17 | 15 |
| October | 4 | 7 | 14 | 22 | 15 |
| November | 1 | 8 | 16 | 30 | .... |
| December | 1 | 14 | 56 | 44 | .... |
| Total | 44 | 90 | 300 | 663 | 421 |

MORTALITY AND DEATH RATES PER 100,000 OF POPULATION

| 1926 | | 1927 | | 1928 | | 1929 | |
|---|---|---|---|---|---|---|---|
| Deaths | Rate | Deaths | Rate | Deaths | Rate | Deaths | Rate |
| 24 | 0.68 | 31 | 0.88 | 143 | 4.05 | 275 | 7.64 |

Outbreaks may be classified as slightly communicable or highly communicable, depending upon the characteristics of the strain of the organism involved as regards its aggressiveness as an invader. Slightly communicable types will be considered first, since they have been responsible for the majority of outbreaks and offer the most perplexing epidemiological problems. These strains produce many clinical typical cases as well as many atypical cases in which diagnosis could only be established by examination of the spinal fluid.

OUTBREAK NO. 1

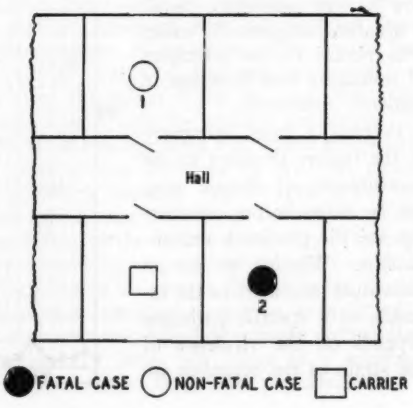
This outbreak was limited to two cases, occurring six days apart, which developed in a military school having an enrollment of about 350. Both cases were quartered on the first floor of a three-story brick barrack. Following the second case, a carrier survey of the entire institution was made and one temporary carrier was found who was quartered directly across the hall from *Case 1* and in the next room to *Case 2* (see diagram). Each of these three rooms was occupied by two cadets and the roommates of the cases and carrier were in close contact with these individuals. All cadets in this barrack messed together and many of them visited in the rooms of the infected cadets during their leisure hours. This outbreak illustrates the fact that something more than the fact of a fairly definite exposure to an incubatory case or temporary contact carrier is necessary for the production of the disease.

Cases presented nothing of special interest from the clinical standpoint.

*Case 1* was an undernourished youth in rather poor physical condition who had not fully recovered from a nasal operation. His response to intraspinal serum therapy was excellent and he made an uneventful recovery, uncomplicated by sequelae.

Outbreak No. 1

BARRACK OF A MILITARY SCHOOL



*Case 2* was a rugged, athletic type, apparently in the best of health, but whose family history suggests the possibility of an inherited predisposition to the disease, his mother having had epidemic meningitis at the age of fourteen and a maternal uncle having succumbed to the same infection. His response to serum therapy was very unsatisfactory and he died after an illness of about two weeks.

It was assumed that the carrier was responsible for these two cases until additional information exploded the theory. Six days before the development of the first case, a visiting basket ball team spent the day prior to a game at this school. The personnel of this team included two former schoolmates of *Case 1* and the carrier and the four young men spent the day together under conditions of close and continued contact. The visiting team entrained immediately after the game in the evening and one of these two visitors developed clinical meningitis on the train that night.

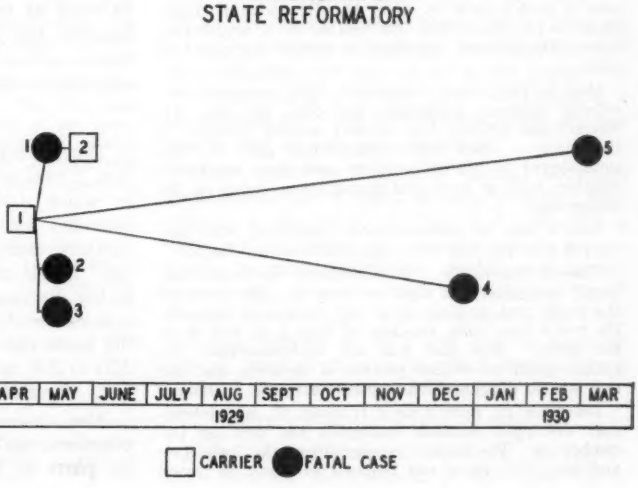
This was the first outbreak during the high incidence of the disease in the past three years in which a complete carrier survey was undertaken and the writer was much surprised and chagrined when only one carrier was found. Failure to find a large number of carriers in subsequent surveys elsewhere in the State with a technic which had been found highly productive of carriers during the World War occasioned considerable concern for a time. Inquiry, however, elicited the information that competent bacteriologists were encountering the same experience elsewhere and, in one instance, a military worker lost considerable face with his commanding officer because he found only three or four carriers in a command in which several cases of meningitis had occurred.

### OUTBREAK NO. 2

This outbreak occurred in a state reformatory in which there were about 650 inmates ranging in age from six to twenty-five years who were housed in badly overcrowded and unhygienic quarters. Officers and their families, to the number of about 50 individuals, were also quartered in the institution.

Five cases, three officers and two inmates, occurred during a period of ten months. Following the third case, a carrier survey of the entire institution was undertaken and revealed two temporary carriers who had no apparent relationship to the cases. Following the fifth case, it was decided to undertake additional bacteriological studies and the fact that three of the five cases had been officers suggested the possibility of a chronic carrier among the officers or their families. While not offered as an alibi, it is worthy of note that during the first survey nearly every person in the institution was using some sort of an antiseptic solution in the nose and throat and, in some instances, the odor of popular commercial products could be detected when taking cultures. Instructions were, therefore, issued to the superintendent of the institution to confiscate all sprays, gargles and antiseptics prior to the second cultural investigation. Portable laboratory equipment was installed in the infirmary without the fact becoming known and the officers and their families were marched directly from the dining rooms to the infirmary without warning. "H" Company was given similar attention, since they had been in close contact with the last case up to the time that he developed the disease. Every precaution was taken to insure accurate, painstaking work, the plan being to take a limited number of cultures with minute attention to details of technic.

Only one carrier was found, a member of "H" Company, whose plate showed almost a pure culture of meningococci. A second culture, taken three days



later, yielded three colonies of meningococci and cultures showing from two to twenty colonies were obtained intermittently thereafter for a period of nearly three months. This carrier showed conditions in the upper respiratory tract which are often encountered in chronic carriers of infections which have their portal of entry through the upper respiratory tract. That is, enlarged turbinates, a large amount of adenoid tissue, badly diseased tonsils and a constricted nasopharynx. Local medication gave the usual unsatisfactory results and this individual was finally released from quarantine, with much trepidation, on the basis of three successive negative cultures taken at twenty-four-hour intervals about three months after the first culture was obtained. This carrier had become a *persona non grata* with officers and inmates alike and he was, therefore, paroled in the interest of his personal safety. It was recommended that he be given the surgical attention indicated by his condition, but this was not done because of the expense involved in hospitalization outside of the institution. He returned to his home in one of the larger cities of the State and two cultures taken at two-month intervals by the city health department have been negative for meningococci. It is worthy of note that, but for the fortunate circumstance of culturing this carrier at the time that his nasopharynx was heavily infected, he might easily have been missed.

The conclusion that this carrier was responsible for these five sporadic cases of epidemic meningitis is based on the following data:

April 25, 1929, the carrier (Fehlker) entered the institution, was assigned to "H" Company and detailed to the rock quarry force, which was made up of men from several companies.

May 4, 1929 (9 days later), *Case 1* (Capt. H.) developed meningitis and died on June 9, 1929. He was in charge of the rock quarry force and rode to and from work on a truck with the men.

This patient was a rugged, robust individual, apparently in the best of health, who had returned to work after a week's spree on April 27. He spent the night prior to his illness with his brother in a neighboring town. The brother remained a carrier for about a week.

May 8, 1929, *Case 2* (Sinclair, "G" Company) developed epidemic meningitis and died on May 14. Sinclair and Fehlker (the carrier) worked together in the quarry. They were acquaintances prior to their commitment to the reformatory and were constantly together, both at work and during leisure hours on the playground.

*Case 2* was an undernourished individual who contracted a severe cold three days prior to his illness.

*Case 3* (Stromboly, "G" Company) developed epidemic meningitis and died on June 11. He occupied the bunk next to *Case 2* in "G" Company barracks. He was a very close associate of *Case 2* as well as of the carrier. This case was an undernourished Assyrian, given to violent periods of hysteria, and the case was so diagnosed when admitted to the infirmary.

December 26, 1929, *Case 4* (Colonel T., superintendent) developed epidemic meningitis and died on December 28. The carrier escaped from the institution and upon his return was required to report in person to Colonel T. each day. Colonel T. developed the disease seven days after the first interview.

*Case 4* was a somewhat obese individual, 67 years of age, who had lost twenty pounds in weight in the month prior to his illness. Loss of weight was ascribed to a severe protracted cold and the worries incident to assuming management of the institution.

March 7, 1930, *Case 5* (Captain M., in charge of "H" Company, the carrier's company) developed meningitis and died on March 9. Had used physical force in disciplining the carrier six days prior to the onset of the disease. He was about 45 years of age; he had experienced a severe gastrointestinal upset a few days prior to the development of the disease.

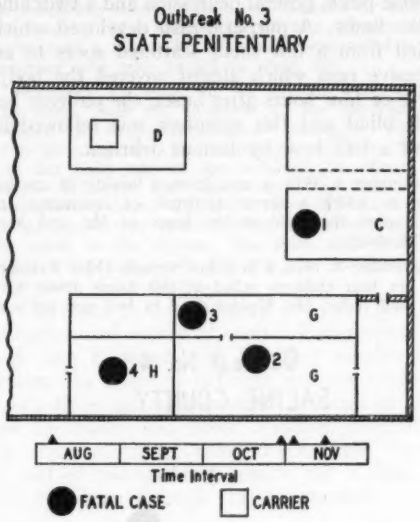
Every case, as will be noted, gave a clear-cut record of contact with this carrier at the time of the existence of a condition which would be expected to lower the general resistance. There were numerous similar exposures which did not develop the disease and the wide variation in the number of meningococci obtained in cultures from the carrier at different times would seem to indicate that with this strain, the number of organisms transferred in a given infection was as important to a successful invasion as the lowered general resistance of the individual.

No further cases have occurred in this institution following the removal of the carrier. While it is deemed of no significance by the writer, it should be noted that sufficient pressure was brought to bear from various sources, including the community in which the institution was located, that some other measure was indicated as a matter of policy. The inmates, officers and their families were, therefore, given three intramuscular injections of meningococcus bacterin at weekly intervals. The use of this bacterin has not been extended to new admittances and no cases have occurred among those admitted to the institution since the outbreak.

### OUTBREAK NO. 3

This outbreak was very similar to *Outbreak No. 2* and occurred in the State Penitentiary, in which 4,000 men were housed in quarters intended for 2,500, with very unsatisfactory sanitary facilities and inadequate medical service. Single cases occurred in the halls indicated in the diagram with only one possible secondary case (*Case 4*). Cases and the carrier were living under conditions of closest contact with from 100 to 200 men, and carrier surveys gave no results of value.

The cases were skilled laborers, painters, plumbers, and so on, whose duties took them to all parts of the institution as well as outside




the walls, and while they were not in continuous contact with each other, they frequently worked on the same construction jobs. Cultures revealed a chronic carrier, a painter, quartered in "D" Hall, a dormitory housing upward of two hundred men among whom no cases occurred.

August 5, 1929, *Case 1* (Farney) developed meningitis and died on August 15, 1929. He was quartered in "C" Hall flagging (corridor in front of the cell block). One hundred and eighty-two men were quartered in double deck bunks spaced 18 inches apart on this flagging and opportunities for exposure of a considerable number of these men were excellent. A carrier survey of this group three days after the removal of the case failed to reveal a single carrier and no other cases occurred in this group.

October 29, 1929, *Case 2* (Kearns) developed meningitis and died on November 2, 1929. This case was quartered in "G" Hall in a double cell in the lower tier of a four-tier cell house. The men were allowed considerable opportunity to loaf outside of their cells at certain times during the day, affording opportunities for extensive exposure.

November 3, 1929, *Case 3* (Kirkpatrick) developed epidemic meningitis and died on November 6, 1929. This man was quartered in a dormitory opening off of "G" Hall and with entrance through "G" Hall. Because of the lack of light, ventilation and proper sanitary facilities, the men in this group were moved to quarters of a somewhat better type, known as "H" Hall.

November 17, 1929, *Case 4* (McDaniel) was transferred from "H" Hall to the hospital in a delirious condition after having been ill in quarters for about 48 hours without medical attention or the notification of those responsible for the administrative control of the outbreak. He died on November 19.

A carrier survey of "G" and "H" Halls failed to reveal a carrier. Contacts with these cases were also cultured and revealed what proved to be a chronic carrier quartered in "D" Hall. This man was a painter whose duties took him to all parts of the institution and who had worked in close association with those who had developed the disease.

In this outbreak extensive exposure to cases occurred, yet the number of cases developing was extremely limited and was confined to individuals who did not have close contact with cases. In the cases which developed, it was found that the individual was suffering from some condition which would be expected to lower his resistance below that of the general average of the inmates of the institution.

### CONCLUSIONS REGARDING TRANSMISSION AND SUSCEPTIBILITY TO EPIDEMIC MENINGITIS INVOLVING STRAINS OF THE MENINGOCOCCUS WHICH ARE NOT AGGRESSIVE INVADERS

The three outbreaks cited above illustrate clearly that exposure to a case or temporary carrier in which the strain of the meningococcus involved is not an aggressive invader is of minor importance in the transmission of the disease. The chronic carrier, who at times is capable of transmitting tremendously heavy infections of meingococci, appears to be the chief source of the sporadic cases of meningitis commonly encountered. The combination of heavy infections with the lowered general resistance of the host seem to be necessary to produce cases.

The temporary contact carrier who clears up in a few days is combating his infection and the organisms are not likely to be present in sufficient numbers at any time to constitute a serious menace, even to individuals who are not in the best of physical condition.

Cases, either incubatory or clinical, have not been productive of many secondary cases. This appears to be due to the fact that ordinarily a very few organisms are transferred in an exposure to such individuals. In this connection, it is worthy of note that Carbonel and Cook[7] were able to isolate the meningococcus from the nasopharynx of only one out of fourteen clinical cases of the disease which they cultured in the Letterman General Hospital.

### HIGHLY COMMUNICABLE OUTBREAKS

Only two outbreaks of epidemic meningitis have occurred in Missouri in the past three

years which could be classified as highly communicable. While considerable difference in ease of transmission was shown, they are so classed because of the fact that more than half of those who were definitely exposed contracted the disease and the cases were of the fulminating type, giving a classical clinical picture. Highly aggressive strains of this type offer a less difficult problem of control than the sporadic type since the source of the infections is quite easily traced.

OUTBREAK NO. 4

The four cases in this outbreak were confined to a very poor family in which there were six children, living with their parents in a three-room shack. Cases were from two to thirteen years of age and occurred on April 5, 7, 8 and 9, 1930, as shown by the chart.

One of these cases became ill while in school and no other cases occurred among the pupils of this rural school. Apparently, even with this moderately aggressive strain of the organism, heavy infections incident to the prolonged or repeated exposure in overcrowded, poorly ventilated living quarters was necessary to transfer a sufficiently heavy infection to produce a case of this disease.

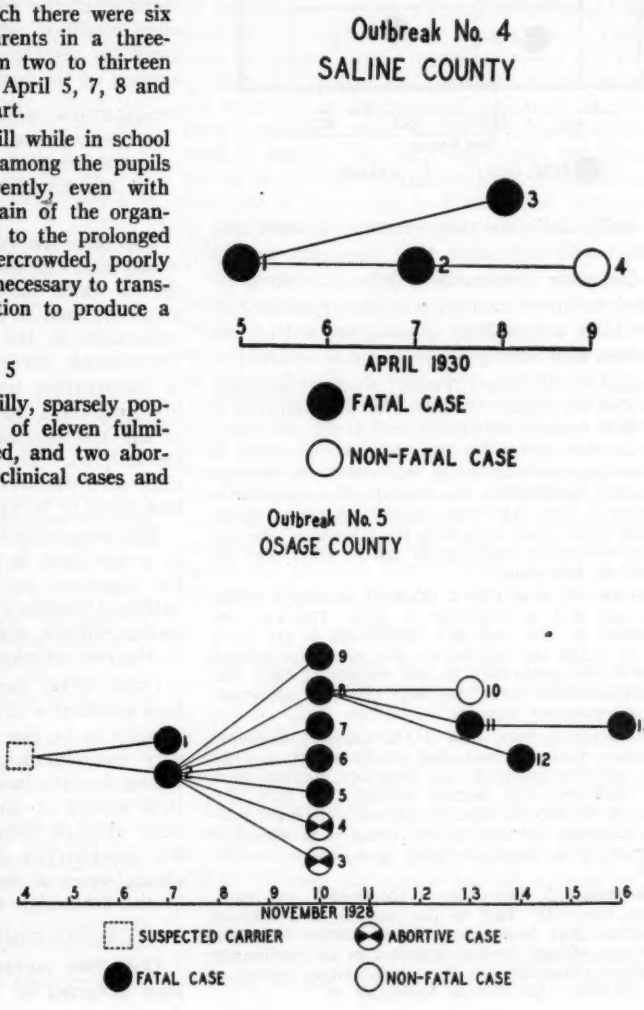
OUTBREAK NO. 5

This outbreak occurred in hilly, sparsely populated territory and consisted of eleven fulminating cases, ten of whom died, and two abortive cases. Seven of the ten clinical cases and one of the two abortive cases were adults over thirty-five years of age who were in apparent good health at the time of exposure. The majority of cases died in from 11 to 14 hours after they became ill. Only five definite exposures failed to develop the disease. The incubation period was invariably three days.

The onset of these cases was sudden and consisted of a violent chill lasting about thirty minutes and accompanied by a severe basal headache. These symptoms were followed by nausea and vomiting. There was a moderate elevation of temperature and a feeble pulse, general depression and a twitching of the limbs. A purpuric rash developed which varied from a few small scattered spots to an extensive rash which almost covered the body. Three or four hours after onset, the patients became blind and this symptom was followed in about a half hour by furious delirium.

November 4, 1928, a man from a locality in another state, in which a severe epidemic of meningitis existed, spent the night at the home of Mr. and Mrs. Sam Kessler.

November 7, 1928, a neighbor woman (Mrs. Cramer) and her four children called at this home about 6:00 p.m. and found Mr. Kessler dead in bed and his wife



in a delirious condition near by. Assisted by her oldest daughter, Mrs. Cramer carried Mrs. Kessler downstairs, built a fire, called a physician and called in two neighbor men who passed to assist her.

November 10, 1928, all the persons who were in this home, with the exception of the physician, developed the early symptoms of meningitis within a three-hour period. The symptoms of Mrs. Cramer and her eight-year-old son subsided in about two hours. Recovery was prompt and they were considered abortive cases. The other three children and one of the adults died within eleven to fourteen hours of the onset of the disease. The third adult lived for about forty-eight hours and was the source of three more cases of the disease.

The chart of this outbreak gives the time distribution and source of cases. Every secondary case was a person who attended another case during the stage of delirium without observing precautions against infection. Isolation of cases, use of masks and other standard precautions by those attending cases checked the further spread of this outbreak which, for a time, bid fair to sweep through this community.

## SUMMARY AND CONCLUSIONS

*Epidemiology.*—(1) The aggressiveness of the strain of the meningococcus as an invader, the number of organisms involved in an infection and the general resistance of the host are of equal importance in the transmission of epidemic meningitis.

(2) With strains of the meningococcus which are not aggressive invaders, cases and temporary contact carriers are of secondary importance in the transmission of epidemic meningitis, since contact with such individuals rarely results in sufficiently heavy infections to produce the disease.

(3) The chronic carrier is not making a successful effort to rid himself of the meningococcus and is the chief source of sporadic cases of epidemic meningitis, since he is intermittently capable of transmitting heavy infections to contacts who might be able to resist the attacks of small numbers of meningococci of slight aggressiveness, but will succumb to heavier doses of the same organism.

*Administration.*—(1) The control of epidemic meningitis is primarily a function of the administrative health official rather than the bacteriologist and the general carrier survey.

(2) Cases of epidemic meningitis should be isolated and attendants should wear masks and observe the other precautions commonly employed in attending cases of disease in which the portal of entry is through the upper respiratory tract. Close contacts should also be segregated for an arbitrary period of time (probably two weeks) regardless of negative cultural findings. Every effort should be made to avoid overcrowding and insanitary environmental conditions among contacts. Special attention should be given to ventilation, humidity, and freedom from dust in the quarters in which contacts are held.

Developments during the period of isolation and segregation will demonstrate whether the disease is of the highly communicable or sporadic type and appropriate control measures may then be instituted.

(3) Detailed and exhaustive epidemiological studies of cases and contacts should be made during the isolation period.

(4) If further sporadic cases occur, the limited group of individuals suggested by epidemiological studies as the most likely chronic carrier prospects should be subjected to repeated bacteriological studies. In carrying out these studies, cultures obtained from the spinal fluids of cases in the outbreak should be considered the type of organism for which search is being made, since gram negative diplococci are sometimes encountered as the causative organism in outbreaks of meningitis which do not agglutinate with antimeningococcic serum or give the typical fermentations of the meningococcus. Such organisms will be missed in routine examinations for typical meningococci and their study demands the services of an experienced and sagacious bacteriologist. This type of investigation cannot be carried out satisfactorily in connection with an extensive, wholesale carrier survey.

## ACKNOWLEDGMENT

The writer wishes to express his appreciation of the cooperation of Dr. Ross Hopkins and Mrs. Naomi Goodin in furnishing the statistical information included in this paper and Dr. R. L. Russell for epidemiological data on *Outbreak No. 4.*

## REFERENCES

1. Smith, Jr., Joseph W.: Administrative Control of Epidemic Meningitis. The Military Surgeon, 67:170-172, Aug., 1930.
2. Branham, Sara E.: A New Meningococcus-like Organism from Epidemic Meningitis. Public Health Reports, 45: No. 16, April 18, 1930.
3. Smith, Jr., Joseph W.: An Epidemic of Cerebrospinal Meningitis. The Military Surgeon, 67:605-614, Nov., 1930.
4. Mink: Epidemiology and Public Health, Vol. 1, p. 577, 1922.
5. Murray: Special Report, Series No. 124, Medical Research Council of Great Britain.
6. McCoy, G. W.: Meningococcus Meningitis and Measures for Its Control. Public Health Reports, 44: 1595-1599, July 9, 1929.
7. Carbonel, A.; and Cook, E. L.: An Outbreak of Meningococcic Meningitis. The Military Surgeon, 64: 49-74, Jan., 1929.

## DISCUSSION (*Abstract*)

*Dr. L. M. Graves, Memphis, Tenn.*—It will be noticed that the first three outbreaks presented occurred under circumstances which lend themselves most readily to such careful study as the essayist has made: the first in a military school, the second in a reformatory, and the third in a penitentiary. In the occurrence of outbreaks in the general population, study is much more difficult. Location of the contacts is an extremely hard and even impossible task.

In Memphis, during the early part of this year, we had a serious outbreak of meningitis of about 300 cases with a mortality of 51 cases. During the latter months of 1929 in our Marine Hospital in Memphis we had about 50 cases, 9 of which were local cases and 41 of which had been brought in from other counties and states, so that for that year our local number was about normal. In the early part of 1930 we had what might be termed our local problem.

We have 30 per cent negro population; 72.3 per cent of our cases were colored with 75.6 per cent deaths among the colored cases. The majority of our cases were located in one or two very thickly populated negro districts of the city. As to age distribution, we found between the ages of 20 to 30 a great number of cases. That is said to be unusual in a civilian population. We found in one year the mortality rate exceedingly high, and for 50 years of age out of 11 cases, 10 deaths occurred. We found both types. We found also that contacts with both types of cases did not always develop the disease. We were impressed with the fact that contact with cases seems to have not a great deal to do with the spread of the disease, and contact with carriers is problematic. It was our practice in the beginning to investigate our contacts. We had to abandon that. Finally, we adopted an arbitrary period of quarantine for our contacts. We did not quarantine the bread winner under certain circumstances. If there was any contact with children they were quarantined. Almost all of our cases could be gotten into a hospital in Memphis.

*Mr. Laybourn (closing).*—In a civilian residential population there is little that can be done aside from the isolation of contacts for an arbitrary period of time. Fortunately, because of the fear engendered by the disease, public opinion will usually support the health officer in such measures. I do want to emphasize again the importance of exhaustive epidemiological studies when time and facilities permit, since these measures may reveal valuable administrative measures and offer the only possible source of additional knowledge of the principles and factors involved in the transmission of the disease.

The incidence in Missouri during this outbreak was highest in the age groups under sixteen years. Cases were distributed throughout the age groups up to eighty-nine years. As mentioned before, cities of over 75,000 population furnished over three-fourths of the cases reported in the State, again emphasizing the importance of close contact and crowding in the transmission of the disease.

# APPENDICITIS IN CHILDREN*

*By* CARROLL M. POUNDERS, M.D., F.A.C.P.,
Oklahoma City, Okla.

This paper is a humble effort towards the lowering of the present mortality and morbidity rate for appendicitis in children. We here have a situation that should lend itself to a considerable amount of improvement. Appendicitis is an affliction for which surgery offers a remedy that is almost 100 per cent effective, at the same time carrying very little risk if made available at the proper time. Still, the number of cases that die or have a prolonged, stormy recovery due to rupture and complications, should cause us some concern.

An attempt to analyze the various causes for the mortality and morbidity rate of appendicitis in children brings out the following factors:

(1) As pointed out by Peterson (1929), the rarity of the condition in young children has been too strongly emphasized. This has had a tendency to cause it to be overlooked.

(2) Careful histories and examinations are neglected. Symptoms and signs that should direct attention to the appendix are often dismissed with the idea that there is merely an "intestinal upset" and a purgative is given.

(3) Certain anatomical conditions peculiar to early life make the diagnosis difficult. As has been repeatedly pointed out, the position of the appendix in children is less constant than in adults, it being frequently much higher than McBurney's point. It may be fixed by vestigial bands, be retrocecally placed and completely buried. The cecum may not have completely rotated. The appendix itself is relatively larger, longer, more funnel-shaped, more delicate in structure and contains a larger proportion of lymphoid tissue. The delicate omentum offers a feeble barrier to the spread of infection when rupture occurs.

(4) It is often difficult to elicit satisfactory signs of localized tenderness and rigidity.

(5) As pointed out by Freedman (1929), there may be a tendency for appendicitis to occur as a sequel to upper respiratory infections. In such an event the diagnosis may be somewhat obscured.

(6) Brenneman (1921), Montgomery (1929)

*Read in Section on Pediatrics, Southern Medical Association, Twenty-Fourth Annual Meeting, Louisville, Kentucky, November 11-14, 1930.

and others remind us that there are in children other conditions that produce signs and symptoms very similar to those of appendicitis.

Now certain conclusions are forced upon us. The anatomical peculiarities and other natural obstacles are going to continue to make the differentiation hard. If the diagnosis is made sufficiently early an effective remedy is available. Nearly all these cases are first seen by the medical man rather than by the surgeon. It is largely upon the former, then, that the responsibility for the outcome rests. This has been forcibly brought home to the writer several times in his own practice. For this reason an attempt is made to discuss a subject that is generally left entirely to the surgeon.

The records of 100 cases of appendicitis in children from four to fifteen years of age admitted to the University Hospital at Oklahoma City during the past five years were recently reviewed. It may be of some value briefly to mention the outstanding diagnostic points as brought out by this and other studies. Kelly (1929) mentions the greater susceptibility of males and quotes Manly as saying the proportion is two to one. This was not the case in our series, as we had 43 males and 57 females. In 31 per cent either the appendix was ruptured or there was abscess formation. The mortality rate was 8 per cent. No deaths occurred where operation was done before the appendix became necrotic or ruptured.

The first indication of trouble is nearly always abdominal pain. This is present in practically every case, and in its absence a diagnosis of appendicitis can hardly be justified. The classical method of onset is with a pain or "stomach ache" in the upper abdomen. This later becomes more pronounced in the lower abdomen and commonly localizes on the right side. This tendency to localize is not very dependable, however. Many children, when asked where the pain is worst, will simply lay the hand on the umbilical region. A history of cases in other members of the family or of previous attacks of abdominal pain favors the diagnosis of appendicitis.

The next symptoms to present themselves are nausea and vomiting. Nausea was present in 87 per cent of the cases and both nausea and vomiting in 76 per cent. So we may say that in the absence of nausea and vomiting the chances are that the diagnosis is not appendicitis. However, it could not be ruled out on such evidence.

While it can at times be a very difficult sign to elicit, some degree of tenderness and rigidity is present in practically all cases. It was apparent in 98 per cent of this series. The degree of tenderness ranges from slight to extreme. The palpation of the abdomen is the most difficult and painstaking part of the examination. It must be done tactfully and requires the child's cooperation. In some cases repeated examinations are necessary. The pain tends to occur in paroxysms and in mild cases there may be no tenderness whatever between paroxysms. Such a child must be repeatedly examined until he is caught in a paroxysm when the tenderness and rigidity are apparent. Generally these signs are more marked on the right side, but may be present over the entire lower abdomen and sometimes over the upper abdomen as well. A rectal examination will often give valuable information and should be done in all questionable cases. Some children are so nervous and irritable that an anesthetic is necessary before a proper examination of the abdomen can be made. A certain amount of tympanites is common.

The presence of high temperature is of value only in ruling out appendicitis. In the simple uncomplicated cases it is not often high; 99.4° was the average in this series. When gangrene is present the fever tends to average a little higher, but is still moderate as a rule. Our average was 101.2°. The only cases that tend to run much fever are the ones in which the appendix has ruptured or an abscess exists. The average was 102.3°. But here the diagnosis is generally not hard to make. So the presence of much fever is evidence that the case is not one of simple appendicitis.

A high leucocyte count is indicative of some condition other than appendicitis. The average total leucocyte count in the uncomplicated cases was 12,500 with 71 per cent polymorphonuclear neutrophils. There are so many variations that a high count can by no means rule out the condition. Fairly high counts are common where there is gangrene, rupture or abscess. Our average for such cases was 18,000 total leucocytes with 83 per cent polymorphonuclear neutrophils. Chills at the onset are so rare as to be of no diagnostic value. Constipation is the rule. The histories studied were not always definite, but 30 per cent of the cases were known to have had cathartics of various kinds before being sent to the hospital. Fifty-eight per cent of the complicated cases (ruptured or abscessed) were known to have been purged. A palpable

tumor mass was never recorded except when an abscess existed and was not always definite then. The flexion of the right thigh, which is frequently mentioned as a symptom, is of considerable value when present, but is not common. Symptoms referable to the urinary tract were not common.

In the differential diagnosis pneumonia and diaphragmatic pleurisy give the greatest trouble. An early right-sided pneumonia often produces abdominal pain and rigidity before any chest signs can be made out. Generally speaking, one can say that in pneumonia vomiting is not so common, the onset is more sudden, the temperature is usually quite high and the breathing is more rapid and abdominal in type. The leucocyte count is greatly increased. X-ray is of much assistance in detecting early chest involvement. The conditions are at times so confusing that even with very careful histories and examinations one who sees many of these cases is apt to witness at least one laparotomy in a case of pneumonia. While such a thing is always regrettable, it has done less harm and is certainly more excusable than to allow an inflamed appendix to remain in place until it ruptures. Inflammation of the retroperitoneal lymph nodes sometimes produces abdominal pain and tenderness very much like that from appendicitis. Abdominal pains which we often see accompanying throat infections are probably from this cause. Vomiting is not apt to be present in these conditions. Pyelitis may be mistaken for appendicitis, but the character of the temperature and the urine examinations will usually clear up matters. A psoas abscess may be confusing, but it generally comes on more slowly and does not produce vomiting or other gastrointestinal symptoms. Intussusception or other forms of intestinal obstruction may be extremely hard to differentiate. An error here is not such a serious matter, as these conditions practically always call for early operation anyhow. When there is much doubt an operation is always the safest course.

Aside from the question of management, certain factors which are not easy to determine seem very definitely to influence the prognosis. Some cases are more dangerous than the rest for the reason that they tend to necrose and rupture early. Other patients may have recurring attacks indefinitely without such consequences. There seems to be no way of determining early by the history, examination, laboratory reports or other means which cases are dangerous and which ones can be allowed to run on. The only safe course to pursue is to make an early diagnosis and operate. In the series studied, 48.8 per cent of the cases that were operated upon as uncomplicated cases of appendicitis and which had easy recoveries, entered the hospital within 24 hours of the onset. Only 8.3 per cent of the cases that ended fatally or had long stormy recoveries due to complications were admitted within 24 hours of the onset. These were kept out for varying lengths of time and, as was previously mentioned, most of them were given cathartics. An encouraging fact is that while the number of cases admitted has increased each year, the trend of the death rate has been downward. Thus during 1926, out of 14 cases admitted, there was a death rate of 21 per cent, while in 1929 there were 24 cases with a mortality rate of 4 per cent.

The proper line of management should be understood and carried out while the case is being diagnosed or is awaiting operation. All suspected cases should be kept in bed and food and cathartics should be prohibited. Generally it is safer to prohibit water by mouth also. However, children do not tolerate being deprived of fluids very well and some care should be exercised here. In the writer's opinion most cases can be given small quantities of water at short intervals by mouth with safety. When it is thought safer to withhold fluids by mouth completely for any length of time, they may be supplied by small retention enemata every three to six hours or by hypodermoclysis. Rectal feedings can be attempted if necessary to maintain nourishment. An ice bag may be applied over the right lower abdomen. A mustard plaster over the epigastrium may help to relieve vomiting. Opiates should be avoided as far as possible. They obscure the symptoms and tie up the intestines. For the relief of pain Kelly recommends solid extract of belladonna one dram to one ounce of glycerin. The skin is thoroughly cleaned over the tender area, the preparation is smeared on and covered with oil silk. The ice bag can still be applied over this. Once the diagnosis is made, operation is the only safe procedure except in the presence of certain complications.

## SUMMARY

Appendicitis in children is not so rare as has been believed and is probably on the increase. Surgery is entirely effective and almost without mortality if employed sufficiently early. A simple acute and somewhat benign appendix cannot

be differentiated in the preoperative stage from one that is gangrenous or about to rupture. Therefore early surgery is the remedy for all. An early diagnosis is often difficult, but with sufficient care, can usually be made. The medical man rather than the surgeon is generally called to see these cases and therefore is more responsible for the outcome. Mistaking cases of appendicitis for simple digestive disturbances, giving cathartics and delaying operation are the chief factors in maintaining a high mortality rate. Attacks of abdominal pain or "stomach ache" with vomiting, slight rise of temperature and no diarrhea should be diagnosed as appendicitis until such a diagnosis is disproven. Some tenderness and rigidity can nearly always be found if looked for. A high fever and high leucocytosis helps to eliminate simple acute appendicitis. In young children acute inflammatory processes of the right side of the chest are frequently mistaken for appendicitis. The differentiation can usually be made by a careful history, physical examination and laboratory tests (including x-ray pictures of the chest). If appendicitis cannot be excluded, an exploratory incision is justified. Medical men are diagnosing cases of appendicitis in children earlier and giving them the benefit of surgery. The result is a lowering mortality rate.

REFERENCES

Brenneman, J.: Amer. Jour. Dis. of Child., 22:493, Nov., 1921.
Freedman, H. J.: Arch. Ped., 46:604-616, Oct., 1929.
Kelly, S. N.: Surgical Diseases of Children, vol. 2. C. V. Mosby Co., 1929.
Montgomery, A. H.: Surgical Clinics of North America, vol. 9, pp. 367-374, April, 1929.
Peterson, E. N.: Ann. Surg., 89:48-53, Jan., 1929.

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DISCUSSION (*Abstract*)

*Dr. James H. Pritchett, Louisville, Ky.*—There is no question in my mind that appendicitis in childhood is on the increase. It follows in the wake of acute infections, especially the upper respiratory system. The seemingly high mortality is due to three main factors: prostration, purgation, perforation. Properly speaking, we have three main types of appendicitis. First, those presenting clear cut symptoms, offering an easy diagnosis. Second, the border-line cases which simulate other diseases. Such cases tax one's diagnostic ability to the limit. Third, those extremely atypical cases which almost defy diagnosis until exploratory operation is done. It has been said by Finney that in the adult the tendency is to mistake appendicitis for something else, whereas in children the opposite is true. As an example, acute pyelitis as a snap diagnosis may prove to be appendicitis. In diagnosis, careful repeated palpation will be of great aid. The position the child assumes in bed is also of help. And last a careful blood examination (Schilling's) will be our final guide. The treatment, without exception, is surgical, of course, the earlier the better. Even in those cases in which we are somewhat in doubt (all the evidence having been carefully considered) it is probably better to operate early, when the danger is slight, than to wait conservatively until a gangrenous appendix or perforation results.

It is wise to consider every case of acute abdominal pain accompanied with some fever and vomiting as acute appendicitis until it is proven otherwise.

*Dr. W. Ambrose McGee, Richmond, Va.*—The increase in appendicitis was forcibly brought to my attention recently. In one area of about five or six blocks in the city of Richmond there were seven or eight cases which came to operation within a few months. I am glad to say they were not all my cases.

In gangrenous appendices, in male children as well as in adult cases, if you press around the theoretical McBurney's point there is some retraction of the right testicle. That sign has been found to be valuable.

The only child with apparent appendicitis that I would hesitate to operate upon is a child who has a past history of allergy. I recall a child who had several attacks which were diagnosed as appendicitis. I found that he was sensitive to a few foods and that each time he took one of those foods he had an attack which looked like typical appendicitis.

*Dr. A. C. Jackson, Jasper, Ala.*—We had a paper in the Section on Surgery yesterday citing the different things that cause a high mortality rate in surgery. One thing mentioned was acute appendicitis, which is with us yesterday, today, tomorrow, and forever.

Of all the conditions that may produce acute abdominal pain, even in childhood, the most probable thing is acute appendicitis. This point was brought to me by Dr. Stone, of Boston.

A few years ago I reported a series of cases of appendicitis in children before the Alabama State Medical Association. In going through the list of consecutive operations, on children as well as adults, out of a series of 133 cases there were 20 in children under twelve years of age, making an incidence of about 15 per cent. The outstanding thing in the series was that the cases operated upon early did well, and those that were operated upon late did not do well. That is the problem that we are discussing today: to get them early enough.

*Dr. Pounders (closing).*—The medical man is responsible to a greater degree than the surgeon for the mortality rate in these cases. Therefore it is to the former that we must appeal in our efforts to lower this mortality rate. The surgeons are already well acquainted with the consequences of neglect and delay.

As was pointed out, every case in this series that was operated upon before necrosis, rupture or abscess took place, recovered. Death occurred only in those cases that were neglected and allowed to go too long.

The gastrointestinal tract of the child might be considered the alarm box for the whole system. No matter what else may go wrong it is generally upset. The task of picking out the cases of appendicitis from all the cases of abdominal pain and vomiting is not an easy one.

In practically every case of appendicitis that I have had in private practice, there have been other instances

of the disease in the immediate family or in near relatives. So I feel that the family history can be of considerable help in making a diagnosis. It is much easier to convince parents of the necessity of an operation when other members of the family have been successfully operated upon.

## DIPHTHERIA IMMUNIZATION IN PRIVATE PRACTICE*

*By* WM. WILLIS ANDERSON, M.D.,
Atlanta, Ga.

Although much is being written about diphtheria immunization in groups of children in schools, charitable organizations, foundling homes and clinics, there is comparatively little literature on immunization in private practice. For this reason the following study has been made.

Of 500 children seen consecutively, 80 were immunized by me; of these 80, 54 received toxin-antitoxin and 26 received toxoid. Of the remaining 420 children, 98 had been immunized by other physicians. There was then a total of 35.6 per cent who had been immunized. Ninety of these 500 children were less than one year of age, in many instances only a few weeks or months of age at the time of this study; these were, therefore, too young for immunization. Ten of this series are dead. The remaining 222 children are difficult to classify. In 88 instances the child was seen either in an emergency or in some serious illness. This group was not questioned as to diphtheria immunization.

Immunization has been urged in 80 cases, but the parents for one reason or another have refused it. In an additional 54 cases, parents have failed to bring their children for immunization; these have been classified as indifferent.

At first glance these figures may seem unfavorable, but if they are studied more carefully I do not think they are so disheartening. By far the larger portion of a pediatrician's practice is made up of younger children rather than those in the school age group. The latter are usually treated by the family physician so that they have subsequent opportunities to become immunized. In due time, probably 80 or 90 per cent of the 90 children classified as too young will be immunized. Certainly, some of the unquestioned group have been immunized. Incidentally, 4 of this same series of 500 children were seen for the first time with diphtheria. Not one of the four had been immunized. Studying these figures from a purely optimistic standpoint, 16 per cent have refused immunization and 10.8 per cent are indifferent.

The following 500 consecutive diphtheria immunizations (not consecutive patients) have been studied under the following headings:

(1) Whether immunized with toxin-antitoxin or toxoid
(2) Age in months and weight in pounds at time of immunization
(3) Reactions
  (a) Toxin-antitoxin
    (1) None
    (2) Local
    (3) Systemic
  (b) Toxoid
    (1) None
    (2) Local
    (3) Systemic
(4) Schick tests six weeks or more following immunization
  (a) Toxin-antitoxin
    (1) Positive
    (2) Negative
  (b) Toxoid
    (1) Positive
    (2) Negative
(5) Immunizations repeated subsequent to Schick tests
(6) Subsequent Shick tests
(7) Occurrence of diphtheria

Of the 500 immunizations, 462 children received toxin-antitoxin and 38 received toxoid. Immunization was usually done at about 12 months, but occasionally an overgrown child weighing 18 to 20 pounds was immunized at 6 or 7 months.

Of the 462 children receiving toxin-antitoxin, six (about 1 per cent) had systemic reactions following one or more of the three injections. Systemic reactions included such symptoms as high fever, headache and nausea. Of these six, two were brother and sister who formerly had positive Schick reactions. One child subsequently died of bronchial asthma. Eighteen children had local reactions (redness, swelling at site of injection). I am sure other reactions occurred, as the families of these children are apt to overlook slight reactions. Of the 38 children receiving toxoid, two (about 5 per cent) had systemic reactions, and one had a local reaction.

Subsequent Schick tests gave the following results:

Of the 462 children immunized with toxin-antitoxin, 183 have since had the Schick test.

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Of these, 166 (about 90 per cent) were negative and 17 (about 10 per cent) were positive. Of the 38 children who received toxoid injections, 28 have since had the Schick test. All except one gave a negative result. The positive reaction occurred in the case of a boy about two years of age. He received 2 series of 3 injections of toxin-antitoxin and 1 series of 3 injections of toxoid and still gave a positive Schick test. This is the only child of those tested in this series who failed to show a negative Schick test eventually.

Twenty-three children 6 years of age or older gave positive Schick tests and were immunized. They showed nothing of note other than the well known possibility of a more severe reaction in the case of older persons.

I realize that it is more difficult to obtain accurate figures in private practice than in institutional work. One of the ultimate aims of immunization is the general education and the immunization of the public at large. On the other hand, the children in institutions are apt to be immunized over and over again, while the children in private practice furnish a virgin field for study.

So far, I have seen no child develop diphtheria after proper immunization and a subsequent Schick test. I do not know what will happen to the exception mentioned above.

Controls, as a rule, were not used in the Schick test. If there occurred any doubt as to the reactions, controls were used. The material used has been obtained from the open market, the Georgia State Health Department and the New York City Health Department.

SUMMARY

(1) Of 500 consecutive children seen in private practice, 35.6 per cent have been immunized, 16 per cent by me and 19.6 per cent by others. Sixteen per cent were too young to be immunized. Two per cent have died and in 17.6 per cent data as to immunization are lacking. Sixteen per cent have refused immunization and 10.8 per cent are indifferent.

(2) The occurrence of diphtheria in this series of 500 children is 0.8 per cent (4 in 500) in those who had not been immunized.

(3) In 27 of 28 cases, the Schick test was negative after toxoid. The twenty-eighth case received both toxoid and toxin-antitoxin.

(4) The reactions following toxoid are a little greater than the reactions following toxin-antitoxin.

(5) So far, no child has developed diphtheria after proper immunization and a subsequent Schick test.

CONCLUSION

On account of the possibility of serum reactions later, and because toxoid (even though reactions are slightly greater) seems to confer immunity in a larger percentage of instances, I feel that toxoid should be given preference.

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# THE INCIDENCE, SOCIOLOGICAL ASPECTS AND SUGGESTIONS AS TO THE PREVENTION OF GONORRHEAL INFECTIONS*

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In the public health control of any communicable disease it is most necessary to have accurate statistical knowledge of the prevalence of the disease, its distribution in the population and the trend of the new infections. Such information represents the best measure of the effectiveness of the present day methods of prevention and control.

*Incidence of Gonorrhea in the United States.* The high incidence rates for gonorrhea in the United States found by the United States Public Health Service in their extensive surveys of the past three years, in cooperation with state and local boards of health and the American Social Hygiene Association, are convincing proof that gonorrhea represents a real public health menace.

A nation-wide effort has been made for the past 12 years to have not only each individual physician, but also each public clinic, report to his state department of health the presence of new cases of gonorrhea, and, if possible, the source of the infection. Although the reports from the clinics have been fairly complete, there are still numerous physicians throughout the United States who do not cooperate in this work. In spite of the incompleteness of these reports

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in the past 5-year period, 42 states have reported 785,000 new cases of gonorrhea. A contagious disease which carries a minimum number of 150,000 new cases a year is one which demands our best and most determined efforts toward control.

*One-Day Census Study.*—Before the people of an individual community can be expected to develop a program for the control of any disease, those charged with the care of their health must be able to present convincing proof of the need of such legislation. In fact, it was for this reason that compulsory reporting of venereal diseases to state health authorities was started.

During the past three years the United States Public Health Service has taken a one-day census of cases of gonorrhea under treatment or observation in 25 communities throughout the United States. The results from these data reveal that the monthly state reports are not even fairly representative of the venereal disease problem in the community. In these surveys were included communities ranging in size from towns of 2,500 to whole metropolises, areas with a population in the hundred thousands. Several states were surveyed in their entirety.

These reports were received from sources administering care and treatment to an estimated population of 24,500,000 persons. Instead of the 150,000 new cases of gonorrhea a year reported on the monthly reports, there was an estimated 679,000 new cases of gonorrhea a year which were under medical care the first three months of their infection.

This incidence represents an annual attack rate of 5.7 per 1,000 population, the rate for males being 8.6 per 1,000 population and for the females, 2.7. Since these rates were based on the acute cases of gonorrhea, it is believed that we may assume that these are the minimum number of persons who have been infected in a year. This estimate is based on the number of cases found under treatment as of any one day in the 25 communities surveyed; a report of the average length of time of the patient under treatment or observation for gonorrhea,[1] and the ratio of incidence to prevalence established in two states and one large city of the United States.[2]

*Prevalence of Gonorrhea in the United States.* The above estimate of 679,000 cases of gonorrhea represents incidence or the number of fresh infections annually, whereas the result of the one-day census in the 25 communities gives the prevalence or number of cases of gonorrhea in either the acute or chronic stage constantly under treatment in the United States. With these data as a basis the estimated prevalence of gonorrhea is approximately 474,000 cases. The prevalence rate for gonorrhea from these reports was 5.0 persons per 1,000 population for males and 1.8 persons per 1,000 population for females. The acute cases of gonorrhea among the male patients constantly under treatment are 10 per cent higher than the chronic, while among the female the rate for chronic is 43 per cent higher than the acute. These facts give evidence that gonorrhea not only often is not discovered in the acute stage when laboratory tests are such a help in the diagnosis, but also that women more frequently than men accept the leucorrhea and discomfort of acute gonorrhea and refrain from seeking medical care until serious complications occur.

In those communities in which the negro population formed a significant group the prevalence data were taken separately. The rates found for the negro population in these surveys were higher than for the white, the rates for gonorrhea being 5.1 for negro males and 2.4 for negro females.

These surveys are still being carried forward into new fields and are also being repeated in communities in which they were formerly made so that the trend of the disease can be determined. Therefore, the estimates given here are subject to revision whenever additional data are available, which would indicate that the present figures are not representative. In quoting these figures, however, one should feel that there is certainly sufficient data on hand to indicate that these estimates lean toward conservatism rather than toward over-estimation.

*Comparative Incidence of Gonorrhea and Other Communicable Diseases.*—There is much evidence available to reveal that even those cases of gonorrhea which actually come under medical care are incompletely reported and yet there are twice as many new cases reported each year as those cases of diphtheria reported, more than 4 times as many cases as of smallpox and 6 times as many as of typhoid fever. In fact, in the 21 states where the reporting of tuberculosis (all forms) is compulsory we have 14,000 more new cases of gonorrhea reported than we have of tuberculosis. This preponderance of gonorrhea among the reportable communicable diseases is even more pronounced in the face of converging evidence that approximately 50 per cent of the cases of gonorrhea do not come

to treatment while they are in the acute stages, and further that numerous cases of gonorrheal infections never seek any medical treatment from physicians, but are untreated, self-treated or receive treatment over the drug store counter.

*Sociological Aspects.*—Let us consider for a moment what it means to have approximately 679,000 cases of fresh infections of gonorrhea occurring annually in the United States. Its real social significance lies in the prevalence of the disease among women, estimated at approximately 166,000 of the above 679,000 cases. The disastrous effects of the disease are experienced not only among the married women in the frequent breaking up of the family life, divorce and all the social calamities which follow, but also in the lowered efficiency of the women wage earners. Aside from the economic feature we have the tremendous toll in suffering and even death from various complications following primary infection by the gonococcus in the female. J. J. Abraham claims that 40 per cent of the cases of sterility in women is due to gonorrhea and 50 per cent of all gynecological operations result from this disease.[3] Gonorrhea is also one of the causes of "one child" sterility.[4]

The most tragic sequel to gonorrhea in the pregnant woman is contamination of the eyes of the baby at the time of birth. Ophthalmia neonatorum is responsible for a large proportion of blindness from birth. The gonococcal infection is responsible for from 55 to 65 per cent of the cases of blindness in the new-born. These cases represented 2.9 per cent of the 40,913 population from whom special schedules reporting causes of blindness were returned to the United States Census Bureau in the 1920 Census.[5] In a survey of 57 American institutions for the school year 1924-'25, 19.1 per cent of the cases were credited to gonorrhea, while of 8,000 new admissions, 11.5 per cent were caused by this same disease.[6] Dr. H. D. Lamb found 2 per cent of the total number of cases of blindness to be ophthalmia neonatorum among those persons applying for a pension for the blind in Missouri.[7] McAlister has estimated that the education of the child blinded by gonorrhea approximates the cost of 7 normal children (in lost school hours, special care and medical treatment). Even on reaching adult life these blind persons are still liabilities from a crude economic standpoint, since the earning capacity of those who are gainfully employed is reduced by at least two-thirds, according to the Metropolitan Life Insurance Company in their special study of the burden of the handicapped to the state.[8]

A special manifestation of gonorrhea in the female is the vulvovaginitis of infants and young girls. This is a highly infectious, serious and prevalent disease among young female children, and therefore means isolation with loss of time from school as well as tediousness of treatment for the child. Fortunately less than 1 per cent[9] of these cases are followed by serious complications. However, when they do occur, the tragic results are comparable to those occurring in the older females. In the words of Stokes, gonorrhea in men is an important but hardly a critical ailment, but in women it is a devastating curse.

The marital status of the gonorrhea patient in the clinic was reported in a recent study made by the United States Public Health Service. It was found that of 925 patients there were twice as many single as married. This was true among both sexes of the white and colored races. It was found, however, that there was very little difference between the percentage of the colored married male and female, but this was not true among the white. In the white gonorrhea patients which were reported as married the percentage of females was twice as high as the males. These figures indicate that probably a large proportion of the gonorrhea in the female is essentially innocent.

The statistics on gonorrhea reveal that in spite of state laws for the infants' protection, gonorrhea is still a causative agent in an appreciable number of cases of blindness; that an estimated 8,700 of the fresh infections are among girls under 15 years of age; that annually of the 679,000 new infections approximately 205,000 are individuals under 25 years of age. The very youthfulness of these victims and the disastrous residuals of the disease when neglected or improperly cared for make a strong appeal to all those who are interested or charged with the public health to make every effort to control gonorrhea in the community.

*Prevention.*—Like the poor, we have had, and have, the gonorrheic with us always. Also we have been told by authority there is indisputable evidence that the Chinese were acquainted with gonorrhea more than five thousand years ago. The comparatively modern Mosaic law not only recognized the existence of gonorrhea, but also its infectious character, its latent infectability, the role of the carrier, and prescribed rules for preventing its spread to others. The

results of recent surveys have indicated the extent to which this disease continues to exist in spite of attempts at its control that have extended over a period of at least 5,000 years. In the face of such evidence one must indeed be optimistic to prophesy its early eradication.

Many factors have contributed to the almost uninterrupted dissemination of gonorrhea, not the least of which is its "repulsive connotation" and the popular belief that the disease is not injurious: a sort of defense reaction against the failure to seek treatment through shame.

Also, up to the time of the World War, the *noli me tangere* point of view, maintained in the United States at least, with regard to the public mention of sex matters, aided and abetted by false modesty, greatly militated against attempts to create an enlightened public opinion with regard to the venereal diseases, without which aid the physician and the public health officer are seriously handicapped in efforts for their control. Moreover, advances in the field of venereal disease prevention have not kept pace with the progress made in the control of other communicable diseases. As a class they far outnumber any other disease reported to the United States Public Health Service. If we are ever to succeed in reducing them to a minimum it is essential to carry out certain practices best calculated to accomplish the desired result.

The solution of the problem of the prevention of gonorrhea revolves about two main points: preventing the non-infected from being infected and preventing the infected from disseminating infection. It is doubtful that the first of these postulates will ever be completely satisfied except by educational measures, moral as well as informative. Promiscuity in sexual indulgence, with the potential danger of infection, may not be prevented by sounding notes of warning or by pointing out the serious consequences of infection to the individual or his future wife, if unmarried. The solution lies deeper than this and depends in far larger measure on the slow, at times discouraging, and always difficult task of creating a higher moral tone and a stricter sense of moral responsibility toward others among large population groups. Sex education in colleges, schools and homes and allied measures have their field of usefulness, but we must go further and seek to improve the atmosphere of the home by fostering parental education in such subjects as child psychology, the effect of parental precept and example, and of pleasant home environment on the mind, temperament, character and spiritual life of developing children.

Also there are certain positive deterrents to exposure to infection such as notification of cases of gonorrhea under legal provisions, supervision of prostitutes and their segregation, while infectious, under adequate treatment, and the abolition of houses of prostitution. With regard to the latter measure, there appears to be wide divergence of views. These places are considered by some authorities as a necessity for the limiting of the spread of infection by supervision. Their suppression is advocated by others in the name of morality and in respect of the dignity of women, as well as because of the belief that they are without effect on prevention and that the elimination of restricted districts from cities with their facilities for the practice of irregular sex life, has greatly promoted good health and to an appreciable extent decreased the risk and prevalence of gonorrheal infection.

The second postulate, the prevention of the dissemination of the infection by the infected, may be satisfied by no known single measure but rather by a combination of several. One of the most practical and potentially far-reaching measures for extending health protection to the public and promoting social hygiene is the periodic physical examination of each person by his own physician. A complete examination at periodic intervals not only offers opportunity to the watchful physician to give advice in respect of personal hygiene and the avoidance of exposure to infection, but also for the discovery of existing, and possibly latent, gonorrheal infection. The importance of such examination as a preventive measure is being more and more strongly accentuated by the enactment of state laws requiring prenuptial examination of prospective partners in wedlock and the treatment of the eyes of the new-born immediately after birth to prevent ophthalmia neonatorum, and also by the establishment of prenatal clinics by official and volunteer agencies where expectant mothers are examined for the discovery of possible gonorrheal and syphilitic infection.

But the role of the physician in the prevention of gonorrhea is much more positive than the making of complete periodic examinations, important as this measure is. It should, as it does, connote the need of his treating all cases coming under his care until assured of a cure. A tragic result of the failure in this respect has only recently come under the writer's personal notice whereby a bride of less than three months

committed suicide on finding out the nature of her innocently acquired infection.

The provision of state laws requiring the segregation of mentally abnormal women of childbearing age, while directed primarily to limiting the multiplication of feeble-minded delinquents and other types of individuals who are unable to adjust themselves to the conventions of organized society, is also a control measure against prostitution and attendant spread of gonorrhea and other venereal diseases. One feeble-minded woman may be the mother of several children also feeble-minded and potential criminals or prostitutes.

In a psychiatric study of 206 sexually delinquent women at the State Industrial Farm for Women, Lansing, Kansas, made by Treadway, of the United States Public Health Service, in 1918, in connection with the program of venereal disease control in the extra-cantonment sanitary zone of the State, slightly over 55 per cent of them were found affected with mental disorders and over 30 per cent of them were definitely feeble-minded. What is more to the point, gonorrhea was found in 93.6 per cent of them.[10]

In a parallel study by Weldon, also of the United States Public Health Service, of 100 delinquent white women examined for the control of venereal disease in the extra-cantonment zone about Camp Taylor, who were inmates of the Jefferson County Jail and other institutions in Louisville, 87 per cent had definite mental disorders and 38 per cent were feeble-minded. Moreover, in 81 per cent smears made from the cervix and urethra were positive for gonococci.[10]

The quality of the medical service available to communities and individuals and the character of the clinical standards are in direct relation to the adequacy of the treatment for venereal infections and the completeness of their cure. The fact is obvious. A great improvement has been made along these lines in recent years. The standards of medical education have been raised, better teaching facilities are provided, courses in public health are incorporated into the curricula of more and more medical schools to a degree that the average graduate in medicine is better drilled in theory and practice than his predecessors. As a consequence of this change the venereal diseases are being treated more competently and completely with less danger of the spread of infection to others than formerly.

*Prophylaxis, or Self-Disinfection After Exposure.*—Will it be practical? Is it effective? Does it encourage exposure? The limits of this paper preclude the outlining of special methods of prophylactic treatment. The procedure and the relative efficacy of the various drugs employed for this purpose are clearly set forth in any standard work on gonorrhea. The efficacy of self-disinfection as a preventive is measured by the promptness and thoroughness with which it is carried out after exposure, the shorter the lapse of time the more certain the protection.

The establishment of prophylactic stations, except under military conditions and on ships, is of more than doubtful value because they are not likely to be patronized voluntarily. The success of these measures in the prevention of infection may be nullified by carelessness, the association of alcoholism with irregular sex practices, and the refusal of the average individual to carry out a practice which at best is objectionable. In the case of women, the anatomy of the genital organs precludes the self-application of drugs for this purpose as with the male. For this reason, unfortunately, the protection given the male by this treatment is denied her.

Does the spread of the knowledge of self-disinfection and the increasingly ready access to prophylactic packets encourage immorality? There are no data that show that it does. The whole question was most aptly stated by the late Professor J. G. Adami at the Conference on the Arrest and Prevention of Venereal Disease in the Army, held at the Royal Institute of Public Health, and reported in the *Journal of State Medicine* for March, 1919, as follows:

> "If it is justifiable to treat the developed disease, it is yet more so to afford early treatment, and if that, then for security to make it a rule that after every illicit intercourse a man seek protection. The doctrine that 'the sinner must not prepare for immortality but he may use the best means known to science to escape the consequence,—such a doctrine surely if not hypercritical is hypocritical."[11]

There can be no middle course in the matter. The writer is strongly in favor of the thorough education of the public in the prophylaxis of venereal disease.

REFERENCES

1. Venereal Disease Information, vol. xi, No. 8, p. 337.
2. (Mississippi) Venereal Disease Information, vol. x, No. 5, p. 189.
(New York States) Venereal Disease Information, vol. ix, No. 4, p. 143.
(Philadelphia) Venereal Disease Information, vol. xi, No. 1, p. 1.
3. American Health Congress Series, vol. iv, p. 17.
4. Finger. Wien. klin. Wchnschr., Vienna, 1924, xxxvii, 14 (V. D. Abstract).
5. The Blind in the United States, 1920, Department of Congress Bureau of the Census, Washington, p. 32, 1923.

6. American Health Congress Series, vol. 4, p. 24.
7. Lamb: Jour. Mo. State Med. Ass'n., p. 179, May, 1926.
8. Metropolitan Life Insurance Company Statistical Bulletin, No. 5, p. 3.
9. Hamilton: Venereal Disease Information, vol. viii, No. 3, p. 84.
10. Psychiatric Studies of Delinquents. Reprint No. 598 from Public Health Reports.
11. Bayly, Wansey: Venereal Disease: Its Prevention, Symptoms and Treatment. Third Edition.

Discussion follows paper of Dr. Caulk, page 701.

## THE DIAGNOSIS AND THE EFFECTS OF DRUG THERAPY ON THE COURSE OF GONORRHEA*

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There are no truer words than those of Sir William Osler:

"As a cause of ill health and disability the gonococcus occupies a position of the very first rank among its fellows . . . . . gonorrheal infection does not fall very far short of syphilis in importance."

This paper is limited to the diagnosis and treatment of gonorrhea in the male. In Young's "Practice of Urology" there are one hundred pages devoted to the diagnosis of this condition; obviously, then, these remarks must be sketchy. However, certain things in the diagnosis present themselves that seem worthy of mention. The diagnosis as to the etiology is fairly easy; not so, however, the diagnosis of the pathological condition that may follow in the wake of an acute specific urethral infection.

In the first place it appears that urologists confine their entire efforts in diagnosis to local lesions instead of considering the general manifestations of this disease such as the low grade devastating fever, the gastrointestinal symptoms with loss of appetite, constipation, neuro-mental symptoms of sleeplessness, fear, worry, apprehension and the cardiovascular phenomena of rapid pulse and low blood pressure. The work of Bertelsmann and Maw showed a bacteriemia as well as a toxemia accompanying urethral chills, proving conclusively that absorption may take place from the urethra. It is a common observation to see this type of patient frequenting the dispensaries, having such a lowered resistance that no medication is effective, and classified as a neurasthenic with a constitutional inferiority.

For making a diagnosis there is added to the urologist's acumen such a vast array of diagnostic armamentaria that a diagnosis might be presumed in every case, and yet many patients are undiagnosed or misdiagnosed, mainly through the lack of an established plan for a routine survey of the patient. Many of us, I am sure, have been chagrined to find a simple diagnosis after we have forced ourselves to make a careful routine examination.

In the acute processes of gonorrheal urethritis, repeated physical examinations are necessary along with the two glass test to determine the limits of the invasion. Probably the most commonly overlooked condition during the acute stage is an acute prostatitis. This condition will scarcely be missed if this dictum be remembered, "The duty of a consultant is to make a rectal examination."

In the subacute and chronic conditions there must be a determined effort to discover the residual disease found frequently in the glands of Littre, or as infiltrations in the wall of the urethra (strictures), Cowper's glands, prostate gland, seminal vesicles, also granulations, polyps and ulcerations in the urethra and those occasional reinfections of the urethra from a chronic epididymitis.

Here, then, is a mystic maze of diagnostic possibilities offered as long as symptoms persist. Occasionally if the patient be left alone for a while he gets well before a diagnosis can be made. Only too frequently, especially in dispensary practice, is a diagnosis of chronic urethritis and chronic prostatitis made. Treatment is carried out indefinitely along the line of irrigations and dilatations to the urethra, prostatic massage, neglecting to investigate minute urethral infections and the adnexal glandular structures, particularly in those cases of chronic vasitis and vesiculitis which give much discomfort in the lower abdomen and groins and which are diagnosed as chronic appendicitis, hernia, adhesions, or visceroptosis. Among these infected areas chronic prostatitis plays a most important role. Von Lackum has demonstrated that many cases of chronic prostatitis are undiagnosed without provocative treatment. The urine may be clear grossly and microscopically in the presence of a chronic prostatitis and there need not be a history of gonorrhea. Also, in the diagnosis and management of the chronic types of infection it must be

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borne in mind that a pathological condition in the upper urinary tract may be keeping up an infection in the urethra; in other words, that a gonococcal urethritis may occur in some individuals who have an abnormality in the upper urinary tract.

Happily, with the increasing ease in the culture of the gonococcus this means is being used more and more in the differential diagnosis between specific and non-specific types of urethral discharges as well as cultures from the urine, prostatic secretion and material removed with the aid of the urethroscope. Culture in these chronic cases is of utmost value and far supersedes the uncertain complement-fixation test.

The general management of gonorrheal urethritis is of utmost importance. The rest, the nutritious diet and avoidance of constipation, are quite necessary. The ingestion of water not only dilutes the toxins as they are absorbed from the urethra, but frequent voiding helps in cleansing the urethra.

On approaching the local therapy of gonorrhea one is confronted with opinions varying all the way from therapeutic nihilism or absolute reliance on the self-limiting qualities of the disease to what Pelouze calls the "direct slaying" of the gonococci in the tissues. It is apparent that until some specific treatment for gonorrhea is developed there can be no question of standardization of treatment. Each case must be met as an individual problem. The diagnosis of the stages, position and severity of the disease must be determined and therapy applied accordingly.

To begin with, it is universally understood that sexual excitement and alcoholic indulgence do more to defeat general and local therapy than any other factors. This should be impressed on the patient.

The drug situation is bewildering, in spite of the new highly germicidal drugs that have been added to our list of agents to combat infections. The fact remains that the silver salts and albumenates still remain the chief weapon in the attack on the gonococcus in the urethra. In the local treatment the detailed instruction to the patient of the amount of the drug to fill the urethra comfortably and the care of introduction have seemed of as great importance as the choice of the drug and kind of syringe, and certainly we are all under obligations to the glass bulb syringe.

From the literature it is impressive that more and more urologists believe that as high as 90 per cent of the cases of acute anterior urethral infections involve the posterior urethra within a few days of the onset of symptoms, necessitating urethral irrigations rather than the injection of a few c. c. of the gonococcocide into the anterior urethra.

In specifically mentioning drugs I cannot help saying a kind word for potassium permanganate, a drug to which we all return after trying out the newer germicidal agents. I would not hesitate to treat the disease throughout its course with potassium permanganate. Certainly in those cases of antero-posterior acute infections, cleansing the detritus accumulated in the mucosa and in the mouths of the ducts gives a better chance for healthy tissue reactions.

It is not the fault of the therapeutic agent, but the method of administration that prevents the patient from getting well quickly. Unless the patient be taught to relax the urethral musculature and allow the irrigating solution to cleanse the entire posterior urethra, where indicated, as well as the anterior urethra, the cure is delayed. The patient is entitled to this explanation and should practice the irrigation in the prone position until it is satisfactorily accomplished.

In the urethroscopic applications of silver nitrate in the chronic lesions in the urethra, the stronger solutions are so truamatizing that 10 per cent silver nitrate seems a safe and reliable strength to use routinely. Chemotherapy, then, remains our strongest agent in the attack on gonorrhea.

Diathermy is certainly of value in relieving symptoms of the deeply situated inflammations along with the usual measures such as hot sitz baths.

Maximum cleanliness of the external genitals with soap is a very beneficent weapon in the struggle against gonococcal urethral infections and plays a great part in the treatment of dispensary patients. Many cases of acute urethritis have an accompanying cellulitis which is best treated by hot applications or lavages preliminary to intraurethral medication; this also better promotes drainage.

During the war for two months I served in a British base hospital in North Wales and along with other duties I had to administer vaccine to the patients with gonococcal urethritis. It was used every day or every other day in increasing amounts until there was a reaction. Mixed vaccines, differing strains of gonococcal vaccines and autogenous vaccine

were used and I feel safe in saying that none of these patients was improved by its use. Naturally I have lost faith in vaccines.

BIBLIOGRAPHY

Young: Practice of Urology. Philadelphia and London: W. B. Saunders Co., 1926.
Cabot: Modern Urology. Philadelphia and New York: Lea & Febiger, 1924.
Von Lackum, Wm.: Clinical Data on Prostatic Infections. Jour. Urol., 18:293, 1927.
Horwitz and Von Lackum: Pyuria in Chronic Uncomplicated Prostatitis. Surg., Gyn. & Obst., 49:42, 1928.
Dombray, Pierre: The Fixation of the Complementation in the Gonococcic Affections. Comptes rendus de la Societe de biologie, 93:12-13, Junell, 1926.
Torrabuoni, G.: Vaccination and Deviation of Complement in Gonococcic Infections. Gior. itae di dermat e sifil, 68:593, May, 1927.
Pelouze, P. S.: Ven. Dis. Inform., 10:479-493, 1929.
Spence, H. D. L.: Lancet, 1:19-21, 1930.

Discussion follows paper of Dr. Caulk, page 701.

## SURGICAL ASPECTS OF GONORRHEAL INFECTIONS*

*By* JOHN ROBERTS CAULK, M.D., F.A.C.S.,
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It is truly remarkable that a disease as ubiquitous as gonorrhea and so dependent upon invasion of deep structures for its activity and propagation should be strikingly free from the production of pathological processes which demand surgical care.

Indeed, the surgical applications to gonorrheal infection in the male are notoriously negligible. Surgery in gonorrhea consists in surgery of its complications and is administered principally through drainage either by incision, puncture or dilatation.

The demand for surgical intervention has been decidedly reduced since the ill-advised overtherapeusis of the past has been supplanted by milder medication with the advent of notable adjuncts such as chemical and physical therapeutic agents which have entered the field of scientific urology.

Through these prescriptions acute complications are curtailed and chronic, remote lesions forestalled.

During the acute stage of the disease, surgery is directed toward the relief of the inflammatory products pent up in tissues usually glandular or as a result of extension from these structures to surrounding parts. The prepuce occasionally requires a dorsal incision for the relief of a phimosis incarcerating a balanoposthitis which will not respond to other local measures. A paraphimosis which cannot be reduced must be subjected to an incision of the constricting band which prohibits reduction.

*Periurethral Abscess.*—By far the commonest necessity for surgery is for the relief of abscess formations along the urethral canal. These acute lesions occur at any point with the exception of the membranous urethra, which is devoid of glands, and is usually spared from extension both fore and aft by the triangular ligament which encases it.

The most popular and most serious site for periurethral abscess is in the balanic portion of the canal. It may occur on either side of the frenum and in this location may present tedious problems on account of its tendency to create a urinary fistula or a persistent sinus.

Some of these abscesses may rupture spontaneously either into the urethra or through the integument of the penis. They more commonly require incision. If the presentation is intraurethral they may occasionally be lanced on the urethral side, but the most frequent site for surgical attack is on the outer surface of the presenting abscesses. If the cavity is walled off on the urethral side, the lesion may promptly heal, but with a change of pressure resulting from evacuation of the contents, a fistula is very likely to occur which may be stubborn in its healing and later require a surgical procedure for its correction, either by fulguration, topical applications or plastic surgery.

The pendulous urethra near the peno-scrotal juncture is another favorite location for abscesses. Here again care must be exercised in the surgical attention. Some of the smaller abscesses may heal spontaneously, leaving a small indurated area. The larger ones should be opened promptly and require the same delicacy of attention as is demanded by the anterior balanic abscesses.

The large ones occur most commonly in the perineum and result from bulbar infections or extensions from an abscess of Cowper's gland. Early incision and drainage of these abscesses is advisable in order to prevent destructive lesions as a result of pus burrowing through the fascial planes, and to obviate later scarring.

Free drainage is to be recommended and in this vicinity one need have no fear of a per-

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sistent urinary fistula. A midline incision for drainage of these abscesses is usually the one of choice.

In the Barnes Hospital there have been only 30 periurethral abscesses which required surgery. Many of the smaller ones have ruptured spontaneously and others have been taken care of as ambulatory cases in the clinic and were not admitted to the Hospital.

The 30 operations represented the large perineal lesions.

Out of about 400 cases of gonorrhea treated in my private office, 2.7 per cent were complicated with periurethral abscess. In other words, we may expect this lesion in about 3 out of every 100 patients with gonorrheal infections.

*Prostatic Abscess.*—This is another complication which may develop during the course of gonorrhea either in its acute or subacute stage. If palliative treatment fails to check the progress of an acutely inflamed prostate, particularly if diathermy is ineffectual, the chances are that the gland harbors a suppuration which will require evacuation.

The symptoms of a prostatic abscess are usually ushered in with a chill and fever and severe urinary discomfort, frequency, dysuria and retention of urine. In quite a number of cases the patient may run an afebrile course and the abscess be responsible for practically no urinary disturbance.

In the Barnes Hospital there have been but 11 cases of prostatic abscess. In my private practice prostatic abscess occurred in 0.8 per cent.

A number of these abscesses rupture spontaneously, others require evacuation. One of my earliest cases in surgery was a spontaneous rupture of a prostatic abscess which presented itself nearly a week later with what appeared to be a double bubo. On drainage through inguinal incisions a tremendous amount of pus and urine was removed. I found that there was a large perivesical retroperitoneal abscess resulting from rupture on the left side of the prostate, the location of which was easily felt with the examining finger.

Drainage of a prostatic abscess may be effected through puncture or incision. Puncturing may be performed either through the perineum, urethra or rectum. The majority of these abscesses are most satisfactorily relieved by intraurethral rupture. The method of Stevens has worked beautifully in my hands. This consists in rupturing the abscess through the urethra by the tip of a sound under the guidance of a finger in the rectum. I have never seen any complications, immediate or remote, which followed this technic, and in my hands it has supplanted open perineal exposure.

Young prefers to do a perineal prostatomy through an inverted V incision and makes a complete exposure of the prostate.

Thompson, Walker and others puncture through a midline perineal incision without complete exposure.

It is strikingly true that following drainage of one type or another resolution is usually complete and regeneration of prostatic structures the rule. This condition seldom seems to be responsible for late rebellious scarring in the gland.

*Acute Gonorrheal Epididymitis.*—This is by far the most frequent acute complication of gonorrhea. In my practice it has occurred in 17.2 per cent and has been bilateral in less than 5 per cent. In most instances medical measures, such as fixation, heat, cold, foreign proteid or diathermy, will suffice; indeed, diathermy has been of tremendous benefit in acute epididymitis. Another extremely beneficial minor procedure for the relief of the acute symptoms is the tapping of the inflammatory hydrocele which commonly accompanies this disease. This is best done by aspirating with an ordinary Wassermann syringe with a moderate sized needle. The relief is often immediate.

In the hands of most surgeons epididymotomy is reserved for but a few cases which resist such treatment. Some surgeons, however, believe in the performance of this operation in most cases of acute epididymitis, claiming that the immediate results with relief of pain and swelling are better, that the patients are able to resume their duties at an earlier date, and that the likelihood of sterility is lessened.

The Hagner operation consisting in multiple punctures of the inflamed epididymis with a tenotome and drainage of the hydrocele sac is the popular method of the present day.

Cunningham believes thoroughly in prompt epididymotomy for the reasons above given. Many surgeons are prone to employ vasotomy along with epididymotomy, but its value has been considerably questioned.

Belfield strongly advocated the combination of the two operations.

I have performed 9 epididymotomies and 3 epididymo-vasotomies.

Lesions of the upper urinary tract resulting from gonorrhea which require surgery may be passed with a gesture. Pyelonephritis has been described. Nephrostomy, pyelostomy and nephrectomy have been performed in a few cases.

Acute suppurative inguinal adenitis complicating gonorrhea is equally rare and only occasionally is surgical drainage necessary.

It is in the treatment of the complications of this disease developed during the chronic stage, or which have been contributing factors in its chronicity, that surgery finds its principal application. Time will not permit a complete discussion of all the surgical procedures which are employed for the chronic complications resulting from gonorrheal infection, namely: all the operations for stricture, prostatism and the pathological changes resulting from obstructive lesions. I shall briefly enumerate the more common procedures which are applied to these aftermaths.

*Strictures.*—The most frequent late lesion of the urethra is stricture. Over 90 per cent of strictures of the urethra result from gonorrhea. Most of these can be cured without surgery. In my clinic there have been 1,036 strictures of the urethra and only 2 per cent have been subjected to urethrotomy. Gradual persistent dilatation will usually suffice to relieve the stricture.

The French school seems much more prone to open surgery than the American. I believe that most American urologists have materially reduced the number of urethrotomies in the last two decades. The maxim of J. William White, "Dilate if you can and cut if you have to" is a useful guide to follow.

Internal urethrotomies for stricture in the anterior urethra may be performed by the Otis or Maissoneuve urethrotomies, but their popularity has decidedly waned. Except for the treatment of resilient strictures near the meatus, internal urethrotomy is seldom indicated.

External urethrotomy for stricture in the deeper portions of the canal is one of our oldest urological operations, familiar to you all, and needs but little discussion. With a guide it is simplicity itself; without one it may be torment. The method of Cecil of injecting methylene blue through the urethra in order to locate the canal is sometimes helpful. Often retrograde exposure, either through the perineum or suprapubic section, is necessary.

Whether plastic procedures offer any particular advantage in the final result is questionable. I believe that most surgeons resect the stricture, leaving the roof of the canal intact, and built the soft parts around an indwelling catheter introduced either through the length of the canal or brought out through the perineum anterior to the stricture, and rely upon nature's marvelous power of urethral regeneration to take care of the plastic feature. Cabot has advocated resection of the stricture and anastomosis of the urethral ends.

I am convinced that the end results in my cases have been just as good without urethral plastics. Indeed, some of the best immediate results and those which have been durable have occurred in several cases in which simple incision of the strictured area with tube drainage was all that was done.

In cases of fistulous openings in the perineum and scrotum the tissues must be dissected and removed as neatly as possible. Such complications, however, seldom offer any obstacle to healing. Indeed, some of the strictures accompanied by the typical "watering pot" perineum have been perfectly well handled without radical surgery by simple dilatations and curetting of the tracts.

One of the most serious sequelae of urethral stricture is acute urinary extravasation. Here surgery is imminently essential in order to save life. Perineal urethrotomy and free incision with through and through drainage of the involved area are necessary. I had one patient who lived with an extravasation of 5 days' duration; the extravasation was so extensive as to necessitate over 100 incisions for ample drainage.

The subsequent necrosis of tissues requires careful and competent after care, removal of sloughs, constant wet packs, irrigations under low pressure, potassium permanganate being very effective by virtue of its mild antiseptic action and deodorant properties.

*Chronic Vesiculitis.*—This is subject to surgical attack in a small proportion of cases. Vasotomy and vaso-puncture are frequently employed in the hands of some urologists. The majority, however, reserve this minor surgical procedure chiefly for metastatic conditions, arthritis and iritis.

I have seen some remarkable results following vaso-puncture in cases of acute joint and eye lesions, but for the ordinary symptoms such as chronic discharge and reflected pains, little benefit has occurred in over 300 cases in which I have had occasion to use it.

Seminal vesiculotomy and seminal vesiculectomy are occasionally necessary. I am quite surprised to find I had performed these operations only 8 times. Squier, Cunningham, Young and others do them much more frequently and are enthusiastic about the results obtained. The technic of the operations will not be described in detail. The exposure most frequently employed is one similar to that of the Young perineal prostatectomy. The trick of Squier in pulling the vesicles into the wound by means of a tape or braided silk is helpful. The Young seminal vesicle tractor is a great help in proper exposure. Fuller, of course, was the first to propose the open operation for drainage of the vesicles. His operation is familiar to you and needs no description.

Operations for chronic infections of the prostate such as vesical neck resections by open operation and by the endovesical technic will not be described since it is often very difficult to determine whether the inflammatory conditions result from latent gonorrheal infections or from other causes.

An epididymis which has become scarred as the result of chronic epididymitis occasionally requires resection. I have had 2 cases in which partial epididymitis was required to relieve very painful nodules at the tail which resisted all forms of medical therapy. The relief was immediate and lasting.

The resources of surgery are occasionally called upon to aid in remedying sterility resulting from gonorrheal epididymitis. Martin, of Philadelphia, advocated epididymo-vasotomy for those cases of barren marriage in which the male was at fault and the cause was a bilateral chronic epididymitis with azoospermia. Hagner has reported some excellent results following this operation, epididymal and vas anastamosis. Other men have reported modifications in his technic. We have all done a few cases. I am sorry to say that mine have been unsatisfactory. Lespinasse has described a technic in which the individual tubules of the epididymis are anastomosed with the vas. Martin and Hagner lay great stress upon the use of fine silver wire as the suture material. Owing to the delicacy of the ducts and the structures operated upon even an approximation to *restitutio ad integrum* would be difficult.

*723 University Club Building*

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## DISCUSSION (*Abstract*)

Symposium on the Treatment of Gonorrhea, papers of Dr. Clark, Dr. Toulson, and Dr. Caulk.

*Dr. Herbert Schoenrich, Baltimore, Md.*—When we consider the enormous energy and efforts that have been directed to attacking this disease at its source, as well as the radical changes and great strides made in urological surgery, it is most unfortunate, and regrettable, to observe the pathetically slow progress made in the treatment of gonorrhea.

The recent surveys made by the Public Health Service have shown, first, the wide prevalence of the disease; second, that although the modern clinic offers modern facilities and expert services at a reasonable cost, yet these clinics attract only 25 per cent of those suffering with venereal diseases, while 75 per cent still consult physicians in private practice. Of this 75 per cent of patients the majority present their conditions in the incipient stage when expert service is important. The survey reveals that of the entire medical profession today, slightly over 50 per cent include venereal diseases in their practice. But that there is a tendency towards specialization in this branch becomes evident, for the minority of the physicians are treating the majority of the patients.

In gonorrheal infections we are dealing with two largely uncontrollable factors: first, the patient. Because these patients are of the ambulatory type in which home medication and certain restrictions form part of the treatment regime, their faithful cooperation is imperative. Without this, our services are rendered almost nugatory. Their cooperation can be attained only by our own unfailing interest, rational management, the avoidance of rubber stamp routine and frequent personal contact with the patient. The second factor is the nature of the disease, which is perhaps one of the most intractable afflicting mankind. I do not believe in the light of our present knowledge of the pathology of gonorrhea that we can hope perceptibly to shorten the average duration of a simple case. We have heard a good deal today about complications; the point is to keep the case simple and avoid complications. In this respect I believe much can be done by bearing in mind the limitations of the local bactericidal agents. Any successful line of treatment must be simple in application and non-irritating. The patient must be inconvenienced as little as possible and his earnest cooperation must be obtained.

While it is a recognized fact that the organisms have already penetrated the deeper tissues at the time of the appearance of the clinical symptoms, and are therefore largely out of reach of the bactericides, nevertheless the principle should be to keep the surface of the urethra constantly sterilized by systematic and frequent injections, depending upon the reactive processes of the patient for the destruction of the deeper organisms. As Dr. Toulson stated, in the absence of any specific remedy, it is impossible at this time to outline a definite, uniform and reliable scheme of therapy, nor is it possible to estimate the relative merits or virtues of our present popular remedies. We know, clinically

and experimentally, that most of them, the colloidal silver compounds, flavines and mercurochrome, even in dilute solution, are toxic to the Neisserian organisms. We also recognize their limited power of penetration. We know, for instance, that potassium permanganate has cured thousands of cases of gonorrhea, but also that its use has been harmful in other cases. The choice of chemicals, their dilution and method of administration, can be governed only by the character and clinical behavior of each respective case. I was interested to note that Dr. Toulson praised potassium permanganate as his favorite drug. This has largely been my own experience, but more particularly where the irrigation method is used. We have used practically all of the popular remedies; and while some of them may possess certain advantages, potassium permanganate, in the long run, when used judiciously, seems to have a selective action in most posterior cases.

Some years ago my senior associate, Dr. Sylvan H. Likes, devised a simple apparatus which we feel has been helpful in keeping the infection localized to the anterior urethra, thus lessening the complications incident to posterior involvement. This simple apparatus consists of a wooden platform with a notched extension which serves to regulate the height of the prop. The patient leans against the prop, virtually sits on it, gentle pressure is exerted in the perineal region, and the posterior urethra is, in most instances, shut off from possible invasion of the injection fluid, which, although it may do no harm, yet would cause the loss of the antiseptic as a curative agent in the treatment of that part of the urethra upon which we are attempting to concentrate our therapeutic efforts. With the aid of this prop and the penis clamp occluding the meatus, the anterior urethra is virtually made a closed tube, permitting medication to remain *in situ* under gentle pressure for a varying length of time. No claims are made that complications will be prevented, because the most aggravated complications may occur in the best managed cases. But we feel when it is desired to direct medication primarily to the anterior urethra, this apparatus will be found very useful. Dr. Toulson said that the percentage of posterior complications is generally considered to be ninety. I am happy to report that our percentage has been considerably less.

I should like also to call your attention to our meatus clamp, which we feel has special advantages in this particular line of work. The jaws are flattened and elongated. The flattened feature largely overcomes the pinching effect and the elongation of the jaws insures a secure hold of the meatus.

Many attempts have been made to establish a safe standard of cure of gonorrhea. The trauma to the urethra and prostate, incident to most gonococcal infections, often leaves the patient with more or less of a urethritis. It is in establishing definitely the specificity or non-specificity of such conditions that sources of error still lie. Our object should primarily be to clear up this point. The best culture tube, in my opinion, is the urethra itself. For after the disappearance of clinical symptoms and cessation of all treatment, it is only a question of a short time when, through provocative measures, the infection, if still present, may and should be detected bacteriologically and clinically.

I cannot subscribe to the idea of latency of the gonococcal organism. I may define my interpretation of latency as a condition in which the organisms remain *in vivo* for an indefinite period of time, months or perhaps years, without presenting clinical or bacteriological evidence, and then, through some exciting cause, burst out into acute symptoms again. In thirty-four years of the combined practice of Dr. Likes and myself, we have treated many thousands of cases in private practice with adequate facilities to follow them up. We have particularly stressed and satisfied ourselves on this point. So when the patient asks the two usual questions, the first relative to the duration of his case, it is admittedly difficult to hazard an accurate answer, for the duration may be several weeks or perhaps months. But to the second question, as to whether he can be assured of an absolute and permanent cure, I unhesitatingly and unqualifiedly answer in the affirmative.

*Dr. B. S. Barringer, New York, N. Y.*—Several years ago when I was on the staff at Bellevue, we were doing many vesiculotomies. I am very proud to say that in a service of over ten years I have done only two vesiculotomies in my life. They were cases that had been confined to bed for several months with urethral gonorrhea and arthritis. Both of them, I am glad to say, walked out of the hospital cured. It apparently did them some good. I think this operation has been done thousands of times unnecessarily.

We all know that gonorrhea is curable and is cured many millions of times. I think it was Keyes who said that if we had a hundred cases of urethral gonorrhea in the male, and those hundred cases were untreated, 80 per cent of them would be gonococcus-free in a year, some 15 per cent would clean up in the second year, and the rest at the end of the third year. I think that is certainly so, and I believe that we ought not to be quite so pessimistic about getting the patient gonococcus-free.

In my hands the complement-fixation test has been the one very best method for determining the cure of gonorrhea. In New York McNeal, who first started this test, worked out some very good antigens. He mixed eight or ten strains of gonococcus, and he has kept adding strains for this test. I think the efficiency of the test depends on the vigorous work of the serologist in getting a proper antigen.

*Dr. John R. Caulk, St. Louis, Mo.*—Suppose you had a man who was clinically negative and whose complement-fixation test was negative, would you permit him to marry, regardless of the time since his infection?

*Dr. Barringer.*—If I had faith in the serologist, if I had checked up his work clinically, I should permit the patient to marry immediately, regardless of the time.

As a rule, I would make repeated tests. I would get a positive test when the disease was active, which would become negative when the gonococci had vanished. A positive test takes a month or two to become negative.

*Dr. Joseph H. Smith, Memphis, Tenn.*—This subject has been sadly neglected for the past few years. It seems that everybody wanted to present papers on kidney conditions instead of conditions that come in directly or are referred to us daily. We have to contend with gonorrhea today just as we have for years in the past.

Sooner or later we must realize that most of us over-

treat gonorrheal infections. We are responsible for many of the complications. The less useless treatment we employ in the acute stage, the better off the patient is.

*Dr. William S. Ehrich, Evansville, Ind.*—In nearly all medical meetings we hear learned gentlemen read erudite papers on subjects which we may or may not see once in a lifetime; but the subject of gonorrhea, which we see daily and which forms a large amount of our practices, has been absolutely tabu. If we mentioned it we were among the untouchables. Dr. Sherwood was right when he said that the only advance that has been made in the treatment of gonorrhea in the last twenty-five years is in the price.

We have given neoarsphenamine in hundreds of cases that were infected with gonorrhea, but I have seen no improvement in any case following these injections. I have felt that the results obtained by others with mercurochrome did not justify me in using it intravenously in acute cases. I do not think that we cure gonorrhea; the patient cures his disease, and if we can keep those parts as nearly normal as possible and give the patient's tissues a chance, we shall accomplish much. We cannot force the cure. We should use very gentle treatment and not try for speed records. The little things are important. For instance, I saw a patient who had a long-continued discharge, forcibly strip his urethra to demonstrate a drop of secretion. Just that amount of trauma was enough to perpetuate the discharge.

Some time ago I thought that I had an absolute cure for gonorrhea. Depending on a positive statement that the gonococcus would be instantly killed by 108° of heat, I developed an electrode with which by diathermy the urethra could be brought to this temperature. My first paper on the subject was published in 1918. While I still think that diathermy has a place in the treatment of the disease, it will not cure gonorrhea, first, because 108° is not lethal to the organism; and, second, because it causes too much tissue reaction. Perhaps malaria therapy would be curative, but I have not the nerve to inoculate a gonorrheic with malaria and let him have several chills.

Regarding prevention I am pessimistic. There are two methods of approach, education and legislation, both equally useless. In the first place we are trying to combat an instinct stronger than self-preservation itself. Teaching continence or prophylaxis helps, but no person would have contact with another whom he thought infected with gonorrhea. Therefore, why the discomfort of a prophylactic? There is the answer to the failure in civil life. Many years ago I instructed a group of boys on the subject of procreation, and since I have treated many of them for venereal disease.

Legislation does not seem to be successful, either. Our first legislator, a gentleman named Moses, told us "Thou shalt not commit adultery." Excepting the Volstead law, I know of no law more frequently broken.

*Dr. John Caulk (closing).*—I should like to stress the importance of malophene. This drug has been the most useful and most efficacious in the treatment of gonorrhea and I feel confident has lessened the duration of the disease and minimized complications.

*Dr. Toulson (closing).*—In the preparation of my paper I wrote to the Surgeon General's Library and received much information on the complement-fixation test, which certainly is much more commonly used in Germany than in America. Ninety per cent of the papers which I read were at variance with what Dr. Barringer has told us this afternoon.

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## GUMMA OF THE BRAIN*

*By* GEO. B. FLETCHER, M.D.,
Hot Springs National Park, Ark.

Is the diagnosis of gumma of the brain made clinically more frequently than is justifiable?

Can such a diagnosis be made with any degree of accuracy or are we dealing with a brain tumor which can be classified only by microscopical section, if then? Nonne[7] said that statistics regarding the frequency of gummas are of only relative value because many gummas are healed, and this renders histopathologic diagnosis impossible.

We know very well that both the blood and spinal fluid may be negative in this condition. Syphilis of the brain usually manifests itself in the meninges and blood vessels. Gumma of the brain is perhaps the rarest manifestation of this rather common infection of the nervous system and differs from other new growths only in its infectious rather than its neoplastic origin.[2]

Sachs[1] states that gumma of the brain, in his experience, is an excessively rare lesion. In one thousand or more craniotomies he has seen it but three times and in each case the gumma gave all the symptoms of a brain tumor and it was removed, which he believes should have been done. He feels that most of the lesions that are called gumma of the brain are meningovascular syphilis, which responds admirably to treatment, but a true gumma of the brain, which is a connective tissue mass, he does not believe to be much affected by antiluetic treatment.

Many clear thinking men have held and continue to hold that there is a special neurotoxic strain of treponema which has what might be termed a selective affinity for the central nervous system, and no one has yet proved that this is not true. Opinion, however, probably inclines against such a belief.

Regardless of whether we may classify brain tumors as of infectious or neoplastic origin, as malignant or benign, the fact remains that the

*Read in Section on Dermatology and Syphilology, Southern Medical Association, Twenty-Fourth Annual Meeting, Louisville, Kentucky, November 11-14, 1930.

symptoms arising from them will depend upon their location and the amount of invasion of that particular part of the brain substance.

We all have suspected gumma of the brain and have seen symptoms clear under intensive treatment when, as a matter of fact, we may have been dealing with a meningo-vascular lesion. Also, we must not lose sight of the effect of iodides on other types of neoplasm.

Fisher[3] states that some conditions inflammatory in character are due to gummatous infiltration of the arteries or substances of nerve tissue and are usually capable of absorption, with restoration of function of the affected parts.

Fordyce[4] states that a gummatous meningitis involving the convexity follows the pial vessels into the brain cortex and may give the clinical picture of a paresis or a brain tumor. Treatment in such cases may result in a more favorable outcome than is indicated by the serological reports.

Bowers[6] states that it is often difficult to distinguish the gummatous type of cerebral lues from non-luetic types of brain tumor and from diffuse forms of the meningitic type.

Dew[5] noted gummatas four times in a series of brain tumors treated at the Melbourne Hospital over a period of ten years. He suggests surgery as the most suitable form of treatment.

It was originally my intention to present three cases of suspected gumma of the brain, but the more I studied my records the more convinced I became that there was considerable doubt concerning my diagnosis. I am presenting only one case, for the following reasons: first, in this patient there was some evidence of localization; second, the condition yielded readily to treatment.

Because of its ready response to treatment, the process was perhaps an early gummatous infiltration rather than a fully organized tumor, and the classification might well fall under the head of meningo-vascular syphilis. However, I have felt that there is enough evidence of cortical involvement to justify the belief that it was at least beginning gumma formation.

Mrs. E. B., 36 years of age, a nurse, came to me on February 25, 1927, complaining of severe headache, which did not yield to ordinary measures, failing vision and some Jacksonian manifestations, mild in character.

The family history showed nothing important.

She was a widow, mother of three children, the youngest 13 years of age. She had had pneumonia and typhoid fever. The appendix and both tubes were removed in October, 1925. The menses for the previous ten years had occurred about twice each month. There was no history of syphilis.

She felt well until four weeks before examination, when she developed pain in the head over the eyes. On several occasions there had been projectile vomiting. The headache was not severe in the early morning, but became aggravated after she began her work. Vision seemed to be failing and she had noticed a slight tendency to mild Jacksonian manifestations in the left arm and hand.

*Neurological Investigation.*—The pupils were equal in size, circular, and reacted normally to direct concentrated light and on accommodation. The patellar reflexes were equal and explosive; station and gait normal. Examination of the eye grounds shows definite choking of both discs. She could read a few lines of a chart, then the letters ran together.

Wassermann of the blood was negative with the alcoholic antigen, one plus with the acetone-insoluble antigen and four plus with the cholesterinized antigen. When a spinal puncture was made the fluid spurted from the end of the needle, showing increased pressure; it was four plus with 0.2 c. c. in all antigens, contained 43 cells, and globulin and albumin were three plus. On February 28, the patient began taking sodium iodide in increasing doses, mercury rubs and intramuscular injections of oxycyanate of mercury and neoarsphenamine intravenously. On March 9 she reported that the vision was definitely improved and she was without headache. On March 24, after having received seventeen rubs and a like number of intramuscular injections of mercury and two doses of 0.45 grams neoarsphenamine, she developed a mild ptyalism and was allowed to go home and be without medication for a time.

On May 18 she returned for investigation, having been on duty. There was no headache and vision was much improved. Examination of the eye grounds showed definite paling of the temporal halves, especially the right. Wassermann was negative in No. 1 and No. 2 antigens and four plus in No. 3. Again she was given sodium iodide and five intravenous injections of 0.6 grams neoarsphenamine.

On June 18 the Wassermann was negative with all antigens. September 13 the Wassermann was negative in No. 1 and No. 2 and three plus in No. 3. She again started routine treatment and received six additional doses of neoarsphenamine with the other medication as before. On November 24, after a blood Wassermann showing negative in No. 1 and No. 2 antigens and two plus in No. 3, she again received seven intravenous doses of neoarsphenamine with mercury and iodide as before. On January 23, 1928, the eye grounds showed quite a bit of atrophy in both discs. The pupils responded normally to light; she was in good general health; she began intramuscular injections of bismuth weekly, of which she received 20. On August 23 the blood Wassermann was negative. On November 2, the spinal fluid was entirely negative and has continued so since that time and she has been on full duty, the impairment in vision not being sufficient to interfere with the performance of her duties. There has been no return of the headache, vomiting or Jacksonian manifestations.

SUMMARY

The patient showed distinct evidence of increased intracranial pressure, with headache, choked discs, increased spinal fluid pressure and projectile vomiting. The Jacksonian manifestations were evidence of cortical irritation. Blood and spinal fluid were positive before treatment, but after vigorous treatment both became negative. She has slight optic atrophy, but her vision is good enough to permit full duty.

CONCLUSIONS

(1) Gumma of the brain is perhaps the rarest manifestation of neurosyphilis.

(2) As the Wassermann reaction may be negative in both the blood and spinal fluid in this condition, the clinical differentiation from other types of brain tumor is frequently impossible.

(3) There are no pathognomonic clinical features.

(4) There are those who believe that a preliminary course of antiluetic treatment should be tried in all suspected cases, but the consensus of opinion is that gummas do not respond satisfactorily to medical treatment and should be treated surgically, like any other brain tumor.

(5) A case of meningo-vascular syphilis may be so localized as to suggest a fully organized brain tumor.

(6) Statistics regarding the frequency of gummas are of only relative value, because many gummas heal and this renders histopathologic diagnosis impossible.

BIBLIOGRAPHY

1. Sachs, Ernest: St. Louis, Missouri, personal communication.
2. D'Aunoy et al: Amer. Jour. Syph., pp. 175-186, April, 1930.
3. Fisher, Edward D.: Amer. Jour. Syph., 11:35, Jan., 1927.
4. Fordyce, John A.: J.A.M.A., p. 1026, Sept. 28, 1918.
5. Dew: The Medical Journal of Australia, May 13, 1922.
6. Bowers, Paul E.: Venereal Disease Information, p. 495.
7. Nonne, M.: Syphilis of the Nervous System. Trans. by Ball, C. R. J. B. Lippincott Co., 1926.

DISCUSSION (*Abstract*)

*Dr. H. H. Hazen, Washington, D. C.*—On occasions gumma of the brain may develop very much earlier than it should. I recall a case with Dr. Cushing some years ago in which gumma of the brain developed about with the secondary eruption. That was definitely proven by examination of the tissue.

As is well known, it is extremely dangerous to do a lumbar puncture in the presence of a brain tumor. A gumma as to all effects is nothing but a brain tumor. Hence lumbar puncture in the presence of a serious gumma should be done only with careful consideration.

*Dr. Walter J. Highman, New York City.*—I should like to ask Dr. Fletcher precisely in what way a gumma of the brain differs pathologically from a gumma anywhere else. A gumma anywhere in the body is a mass of round cells and plasma cells in definite relation to the surrounding tissue. And from his description I am afraid that his case was not of this type.

*Dr. Fletcher (closing).*—Not being a pathologist, I have had to depend upon the available literature for a description of these tumors. My answer to Dr. Highman's question would be to refer him to the literature cited in my paper. I do recall, however, that many writers state that histo-pathologically it is frequently most difficult to differentiate gummas from other types of tumors, especially after they have advanced to the stage where treponemas are not present. The case I have reported today I believe to be the early meningo-vascular type, largely on account of the fact that the patient responded readily to intensive treatment.

## THE NORMAL SYPHILITIC*

*By* THOMAS W. MURRELL, M.D.,
Richmond, Va.

In most clinics a routine examination of the blood is made on all patients presenting themselves for treatment. When the report of the Wassermann is positive, the patient is usually referred to a department for treatment, which, in a large measure, is routine; modification of therapy being usually due to the age and physical condition of the patient. This paper is presented to suggest that modification of therapy may be demanded by the age of the disease quite as much as by the age of the patient.

It is possible, and no doubt frequently true, that a disease may so long affect a person as to produce a state of permanent parasitism. Through the passage of many years, compensatory processes have been working which in time produce a status normal to this individual. If this be true, it further follows that radical treatment may be decompensatory and by disrupting the individual normal, be harmful to a greater or less degree.

In a recent article on cardiovascular syphilis, the authors[1] report on 85 cases with an average of forty-one years. However, in this group, there were 10 patients over fifty-five years of age and several over sixty. Now, if a patient is discovered to be a syphilitic at the age of sixty, it is reasonable to assume that the disease

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was contracted before he was thirty and the time that he has been a host to the spirochetes is greater than the rest of his life will be. If the disease was contracted at twenty, the proportions would be two to one. With such a man, being a syphilitic must be considered a normal state. In such a case, the cells of the body have compensated to this state of affairs.

The same statements would be doubly true of hereditary syphilis, except for the fact of growth. The constant mytosis of the cellular structure of the growing human is continually evolving a new state of being, and as long as growth is taking place no balance can be struck between the parasite and its host.

The skin and its adnexa, the hair and nails, are in a constant state of mytosis and the intestinal mucosa, bone marrow and endometrium are in the same state. The great organs of the body do not come under this classification. It is more than probable that when growth is attained by the heart, lungs and kidneys, this is the cellular supply which lasts through life. In the words of an English surgeon, "Nature is a wonderful repair woman, but she issues no spare parts."

Patients past fifty who are treated for syphilis do not come to the physician for treatment for syphilis. They seek medical aid because of functional disturbance of some major organ. While syphilis is the cause of this state of affairs, the damage is usually irreparable and ridding the patients of the disease will not restore function. Here improvement will consist in stabilizing a bad state of affairs that it may not become a worse one. Even when therapeutic action is brought to absorb, or prevent the breaking down of gumma, it is yet to prevent the results of the disease and not an attack on the disease itself.

In such a case it would seem that in syphilis of many years the question of function far outweighs the fact of disease. The goal of therapy is to return to the normal. We can with justice attempt to restore normal function in such a patient with antiluetic treatment and at the same time be content to admit the existence of general syphilis as a secondary problem.

Obviously, this does not mean that the secondary problem should not be met, but it does call for a different viewpoint. The fireman thinks only of fire and the quickest way to quench it, but the carpenter, who removes the rotten beam from a building, thinks of the integrity of the whole while reconstructing the part, and works carefully.

The writer is aware that all this is pure didacticism, yet all of us must have seen the case called "Wassermann fast," who has perfect health except when under aggressive treatment.

Some years ago a prominent gynecologist[2] said:

"When I was a young man and enthusiastic, I saw women whose every pelvic organ was out of place, who yet felt well. With surgical confidence, I placed, by operation, these organs back in their anatomical position and everything was all right, except that my patient never felt well again. Since I am older, I place much more stress upon a sense of well being in considering the desirability of operation."

These remarks are applicable to more than gynecology. In syphilis, the criteria of therapy must vary with the age of the disease and the impairment of the function of the major organs. It is fine to have a negative Wassermann, but we must not descend to the grave to get it.

REFERENCES

1. Porter, W. B.
2. McDonough, Ellis.

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DISCUSSION (*Abstract*)

*Dr. Murrell* (*closing*).—The internist with whom I work in Richmond told me years ago that if a patient came to him who was 65 years of age with syphilis, he ignored the disease as long as he could keep him up by giving him a little bismuth, iodide or a tonic. This seems to be a deduction of the internists and cardiologists and is justifiable practice.

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## STREPTOCOCCI FROM BLOOD CULTURES IN ARTHRITIS*

*By* GEORGE F. KLUGH, M.D.,
Atlanta, Ga.

The present views regarding the etiology of arthritis are summarized in a recent editorial in the *Journal of the American Medical Association*[1] and by Cecil[2] in the *Journal of Laboratory and Clinical Medicine*. Briefly, arthritis is believed to be caused (1) by infectious organisms, (2) by disturbances of metabolism, (3) by combined infections and disturbances of metabolism.

This paper is concerned only with the infectious type of arthritis, although it is very probable that disturbed metabolism is intimately associated with lowered resistance and increased susceptibility.

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The streptococcus group has been reported as causative more frequently than any other organisms. Todd and Sanford[3] regard the action of streptococci on whole blood media as the most practicable method of classifying them. They concur in the general opinion that the hemolytic streptococci cause acute infections, the green-growing streptococci cause less acute or chronic infections and the indifferent streptococci are usually non-pathogenic. From this it would follow that the *Streptococcus viridans* would more nearly fulfill the requirements of the causative organism of arthritis. It is the organism most often found in acute arthritis, in focal infections and in bacteriemia. The respiratory tract, especially teeth, tonsils, and sinuses, seems to be the primary portal of entry or focus of infection from which we have our bacteriemia. This bacteriemia may be self-limited and constitute a not uncommon type of fever, or may localize in different tissues, depending on the strain of organism[4] and on the resistance of the patient. Clawson[5] and Cecil[6] point out that streptococci are grown with difficulty from the blood of arthritis cases and that they are isolated only after growing a long time. To overcome this difficulty various special media have been devised with indifferent success. Two factors seem to increase the percentage of positive blood cultures: first the use of sufficient media to dilute the blood ten, or, better, twenty times; second, growing the cultures several weeks.

In a series of blood cultures from 74 cases of arthritis I have succeeded in isolating a streptococcus in 58, or about 75 per cent of the cases. This has been made possible by incubating the cultures from 8 to 10 weeks unless growth is obtained earlier. In the more acute cases the streptococci have usually been isolated earlier, have produced more green pigment on blood media and shown less pleormorphism or involution forms. Blood cultures from the more chronic cases of arthritis have usually taken longer to grow a more delicate streptococcus, producing less green pigment on blood media, and having a tendency to pleormorphism or involution forms. Rosenow years ago called attention to the tendency of *Streptococcus viridans* under certain conditions to assume different shapes. This pleormorphism or tendency to involution forms is more evident in the attenuated forms and during the time the streptococci are becoming accustomed to artificial culture media. The swollen cocci and diphtheroids can often be found in chains with typical normal streptococci. Mellon[7] calls attention to diphtheroid forms in blood cultures from cases where typical streptococci have previously been obtained earlier in the disease. On account of the resemblance of most of the streptococci to Small's streptococcus cardio-arthritidis, agglutination tests were made with Small's diagnostic cardio-arthritidis serum. Several typical green-growing and several less green-growing specimens of streptococci that had been isolated from blood cultures gave strong agglutination tests with this serum in dilutions as high as 1 to 1,280. This suggests that the various strains of streptococci from blood cultures of arthritis and other patients belong to the same general group and that the variations in morphology and cultural characteristics may be accounted for by attenuation from growing under adverse conditions.

Lymph node cultures as advocated by Baer[8] have given a high percentage of growth in the few cases in which they were used. This method apparently owes its success to the long time of incubation, since I have been able to get positive blood cultures on the same patients from which I obtained the positive lymph node cultures.

Autogenous vaccines made from positive blood cultures were beneficial and patients improved under vaccine therapy, together with liberal diet and rest.

In a consecutive series of 614 blood cultures covering a period of 10 years and taken from patients for diagnostic purposes, 123 were positive, or about 20 per cent. Ten years ago a 24 or 48 hour period of incubation was considered ample by most laboratory workers. There has been a gradual evolution in the tendency to increase the incubation period. Neglected cultures left to incubate longer than usual were found positive, then subsequent cultures were incubated longer. The percentages of positive

| Year | Blood Cultures | Positive | Per Cent |
|---|---|---|---|
| 1921 | 57 | 6 | 10.5 |
| 1922 | 89 | 10 | 11.2 |
| 1923 | 35 | 1 | 3 |
| 1924 | 55 | 12 | 21.8 |
| 1925 | 66 | 11 | 16.6 |
| 1926 | 51 | 1 | 2 |
| 1927 | 53 | 5 | 9.4 |
| 1928 | 54 | 7 | 13 |
| 1929 | 68 | 19 | 28 |
| 1930 | 86 | 51 | 59.3 |
| | 614 | 123 | 20 |

| Year | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Streptococcus viridans .. | 1 | 3 | 1 | 7 | 9 | 1 | 3 | 6 | 17 | 50 | 98 |
| Hemolytic streptococcus | 1 | 2 | | 1 | 1 | | 1 | | | | 6 |
| Staphylococcus aureus..... | 1 | | | 2 | | | | | 2 | | 5 |
| Meningococcus ..... | 2 | 2 | | | | | 1 | 1 | | | 6 |
| Typhoid ..... | | 2 | | 2 | 1 | | | | | 1 | 6 |
| Gonccoccus ..... | 1 | | | | | | | | | | 1 |
| Pneumococcus ..... | | 1 | | | | | | | | | 1 |
| Total..... | 6 | 10 | 1 | 12 | 11 | 1 | 5 | 7 | 19 | 51 | 123 |

cultures have fluctuated by years and followed the incidence of respiratory infections; but there has been a marked increase with the use of a longer incubation period.

(1) Streptococci of the viridans type were isolated from the blood of 53 of a series of 74 cases of arthritis by incubating cultures 8 to 10 weeks.

(2) The streptococci from the more acute cases grew more readily, were more typical, and produced more green pigment on blood media.

(3) Streptococci from the more chronic cases were isolated only after growing a long time, produced less green pigment on blood media, and had a tendency to pleomorphism or involution forms. Swollen cocci and diphtheroid forms were observed in chains with typical streptococci.

(4) Agglutination tests of several typical and atypical specimens with Small's cardio-arthritidis serum gave positive agglutination, indicating a general relationship of typical and attenuated strains.

(5) A series of 614 consecutive blood cultures covering a period of 10 years shows a tendency toward a longer incubation period and more positive cultures.

(6) *Streptococcus viridans* is the most common organism found in bacteriemia, and seems to be more frequently found during epidemics of respiratory infections.

(7) The diphtheroids so frequently reported in cultures from blood and tissues of arthritis patients are probably involution forms of streptococci.

BIBLIOGRAPHY

1. Editorial. J.A.M.A., 95:417, Aug. 9, 1930.
2. Cecil, Russell L.: Jour. of Lab. and Clinical Medicine, 4:1177, Sept., 1930.
3. Todd, J. C.; and Sanford, A. H.: Clinical Diagnosis by Laboratory Methods, 6th Edition, 664.
4. Rosenow, E. C.: Jour. Infect. Dis., 45:331, Nov., 1929.
5. Clawson, B. J.: Jour. Infect. Dis., 36:444, May, 1925.
6. Cecil, R. L.; Nichols, E. E.; and Stainsby, W. J.: Jour. Exper. Med., 50:617, Nov., 1929.
7. Mellon, R. R.; and Koch, R.: Abst. from thirty-first annual meeting of Soc. of Am. Bacteriologists.
8. Baer, William S.: Jour. Med. Ass'n. of Ga., 18: 393, Sept., 1929.

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DISCUSSION (*Abstract*)

*Dr. Geo. S. Graham, Birmingham, Ala.*—There has been much active discussion of arthritis during the past several years. As Dr. Klugh has pointed out, evidence has been accumulating in favor of the view that atrophic arthritis is one expression of a streptococcus infection. His findings add further confirmation to that belief. He is in accord also with most other workers in the high percentage of the cases in which this streptococcus has proved to be of the viridans type. The findings with the cardio-arthriditis serum are of much interest. They would argue for a closer relationship between the different types than would have been expected upon other grounds. The increasing percentage of positive results shown in the charted blood culture record for successive years is a healthy sign of increasing technical skill. Several factors are probably concerned in it. First, there has been a tendency among bacteriologists to use increasing amounts of blood inoculum. Then, the lengthened incubation period emphasized by Dr. Klugh. We have had the experience in our laboratory also of an accidental finding of growth in a flask that had been reported as sterile after observation for a few days or a week and that had been officially discarded. Such experiences forced us long ago into the adoption of a prolonged incubation period, though we have not yet lengthened this into 8 weeks, as he recommends. Finally, the present day infusion broth of 7.6 hydrogen ion concentration is a medium almost selective for the streptococcus and in our experience this one factor has increased very greatly the readiness with which the organism can be recovered.

*Dr. H. M. Weeter, Louisville, Ky.*—I wish to ask Dr. Klugh if he has used the commercial dehydrated media in his work and, if so, whether he has found them satisfactory.

*Dr. Roy R. Kracke, Emory University, Ga.*—At Emory University we have been trying to develop a better method for carrying on blood cultures. We have been particularly interested in arthritis. Over a period of the past three years we had had about 10 per cent positive blood cultures. Since making a better culture medium for growing these organisms from the blood

stream, we have been able to increase our positives in chronic arthritis to about 30 per cent. The majority of organisms have been of the diphtheroid group. I was interested to hear Dr. Klugh say that he believes the diphtheroid is probably an involution form of the streptococcus. I believe this is borne out, although some of our diphtheroids, when transplanted, will not mutate to streptococci. Our medium is made of brain suspension with heart-muscle extract, to which is added sodium citrate, for the fixation of complement in the patient's blood. We are working on the theory that the complement in the patient's blood inhibits the growth. If we can fix this complement we shall be able to use much larger quantities of blood than before.

We incubate our cultures of blood for three weeks, one flask aerobically and one anaerobically. I cannot see the advantages of incubating for a period as long as two months.

*Dr. Charles Phillips, Richmond, Va.*—I should like to ask Dr. Klugh how much blood he takes and if he divides it among several flasks.

*Dr. E. H. Sauvignet, Laredo, Tex.*—I wish to give my own personal experience with arthritis. I suffered in February with a severe right sacroiliac arthritis. X-rays made of my teeth showed an abscess of an upper molar on the right side. This was removed aseptically, cultures were made, and a pure *Streptococcus viridans* was found. A vaccine was made, and I injected myself, and here I am without the arthritis.

In 1918 I had a very severe case of diphtheria. Whether we can connect the diphtheria with the *Streptococcus viridans* in my abscess I do not know.

*Dr. Klugh (closing).*—I have used dehydrated media for other work with good and bad results. In blood cultures I have had good results with plain, ordinary broth. I have tried many different types of media.

The amount of blood depends on the ease with which you can get it. I try to use from 1 to 10 c. c. The custom has been to divide it into two different flasks, one with a small amount of blood and one with a large amount of blood. I used the large amount of blood and thought I might find more bacteria, and the small amount of blood on the theory that there might be some complement in the blood that would inhibit growth.

Diphtheroids have no connection with the diphtheria bacillus at all. Sometimes we find the cocci staining as dots, with material running along, so that they look like diphtheria bacilli, but usually the diphtheroids are elongated.

By making smears of the culture I find involuted forms, but very often I have to grow them for a long time to identify them. They are present all the time, but after long cultivation they can be transferred to blood plates.

## ACUTE GALL-BLADDER DISEASE*

*By* R. M. HOWARD, M.D.,
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Many papers are being produced on bile tract disease, important papers that are contributing a great deal to our knowledge of these conditions and their associated complications. Volumes, even, would be necessary completely to cover the subject.

To separate and discuss a few conditions of the gall-bladder when the whole subject of biliary tract disease is closely interwoven, may seem somewhat incomplete, yet, when we consider that these few acute conditions are the ones that demand prompt action, both in diagnosis and management, and that they represent the conditions of bile tract disease that give our greatest mortality if timely and proper action is not taken, then perhaps we are justified in trying to discuss so limited a field.

The function of the gall-bladder is a subject that is still under discussion. It was long thought that its function was to store and concentrate bile for the intestines. Halpert[1] pointed out that its mucous membrane resorbs important constituents of bile, returning them into the circulation, and perhaps by the same process giving relief, and regulation of the pressure within the biliary system while the sphincter of the ductus choledochus is closed. Stasis of bile resulting from dysfunction in any case is the most important etiological factor in the production of disease in this structure. Dysfunction results most often directly, or indirectly, from infection coming to the gall-bladder from another source. Graham[2] believes that it comes most often from the liver. A contributing factor no doubt, as described by Walton,[3] is an increased output of cholesterol from the liver. If gallstones form, the mixed type are found in the first instance; the pure type is found in the latter.

It is not my purpose in this paper to discuss the milder inflammations of the gall-bladder, ordinarily described as cholecystitis, nor to discuss

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the simple attacks of gallstone colic with or without cholecystitis, nor will time permit me to go into the etiology of these conditions and their progressive pathology. In their diagnosis and treatment, the history of their frequency and severity, with the aid of laboratory methods, will guide us. Lahey[4] thinks that

> "Even with these conditions we are considerably handicapped. Even with marked advance in the chemical and the roentgenological studies, the report from the pathologist's laboratory still falls far short of the clinician's desire."

I shall confine myself to suppurative inflammation of the gall-bladder, whether it be a process developing in the gall-bladder with stones, or in one free from stones. These inflammations fall in the classes of simple suppurative cholecystitis, phlegmonous cholecystitis and gangrene of the gall-bladder, perforation of the gall-bladder, pericholecystitis and pericystic abscess.

Suppurative inflammations of the gall-bladder are due to infection by virulent organisms, or to infection when tissue resistance is at a low ebb. Abundant observations have proved that the fact that bile contains microorganisms is no evidence that the gall-bladder is inflamed, but that when the gall-bladder is acutely inflamed microorganisms are found in the bile.

In many diseases, examples of which are pneumonia and typhoid fever, the bile is usually infected. The most common organisms demonstrable in cholecystitis are the colon bacillus and the pus cocci either in pure culture or mixed with other germs. The *Bacillus typhosus* plays a much less important part now than formerly. The virulence of the organism and the resistance of the tissue involved determine the damage done by the infection.

Simple suppurative cholecystitis, or simple empyema of the gall-bladder, is rather rare unless associated with gallstones. Pyogenic cocci, or a mixed infection, are the organisms responsible for the trouble. If associated with gallstones, there is usually a history of a number of attacks of biliary colic, although sometimes this history is not present. In either case the pain of the attack becomes localized in the right upper quadrant and persists instead of being radiating and intermittent. A definite outline of the gall-bladder can be palpated, which is tender on pressure. Constitutional symptoms develop, sometimes mild, as rapid pulse, sweating at night, and some elevation of temperature; or severe, as chills, remittent fever, increased leucocyte count and profuse sweats. Development of severe symptoms usually indicates that dangerous changes have ensued, such as ulceration of the gall-bladder or phlegmonous cholecystitis. To differentiate this condition from other inflammatory lesions in the upper right abdomen is at times rather difficult. A careful history, a careful physical examination, a careful consideration of the symptoms and a thorough knowledge of other possible causes may leave one somewhat in doubt at times, but not often. Exclusion of the right kidney and of a highly situated inflamed appendix are of the most importance in a differential diagnosis. These, if considered, should render the diagnosis fairly certain in the uncomplicated case.

Recurrent simple empyema of the gall-bladder is not infrequent. The primary attack clears, at intervals it recurs, at last becoming persistent, or violent because of some complication. In these cases it may be impossible to palpate the gall-bladder, it having become shrunken, thickened and deeply placed. It may contain pus and is strongly adherent to the surrounding structures. The history will be of most importance in recognizing the condition.

Acute phlegmonous cholecystitis is due to infection with very virulent organisms which are apt to cause gangrene of the gall-bladder. With or without perforation it may produce a rapid peritonitis and death. This condition may or may not be associated with calculi, but most often is, and when this is true the history of previous trouble will usually be characteristic. The symptoms from the first will be violent, the pain will be severe, radiating to the right shoulder and over the abdomen. Extreme tenderness develops over the gall-bladder, there are abdominal rigidity, exhaustive vomiting, and severe constitutional symptoms, such as septic fever, high leucocyte count and a rapid pulse. Ileus is likely to develop early. In diagnosis the locality of the primary pain is important. This condition is most often confused with acute appendicitis, intestinal obstruction and perforated ulcer of the stomach, or duodenum.

Pericholecystitis is usually caused by suppurative cholecystitis. As the purulent infiltration spreads through the walls of the gall-bladder, localized peritonitis occurs, usually as a result of perforation of miliary abscesses in the subserous coats. The gall-bladder becomes adherent to the colon, duodenum, stomach, omentum and even the small intestines. These adhesions serve

as a protection against diffuse peritonitis, but frequently pericystic abscess develops. With pericystic abscess there is great abdominal tenderness, muscular rigidity, and a blood count and temperature indicative of suppuration.

In discussing inflammation of the gall-bladder, J. Chalmers DeCosta[5] says:

"One fact must strike the physician in regard to these cases, that is, that there is a strong similarity between the possible changes of acute cholecystitis and the possible changes of acute appendicitis. In the gall-bladder as in the acute appendix there may be a catarrhal inflammation which may not advance beyond that stage, or which may advance into a more dangerous form; in each structure blocking and stagnation favor infection and aggravate existing infection; in each there may be suppuration, ulceration gangrene and perforation; in each there may be grave complications and disastrous and fatal consequences, and in each prompt surgical operation is usually life saving."

This brief description of the acute conditions of the gall-bladder indicates clearly the importance they assume, and also indicates that in arriving at a diagnosis we must go widely into the field of differentiation of many acute conditions in the abdomen, particularly those of the right side. Acute conditions other than in the abdomen must not be forgotten. Pneumonia and coronary thrombosis may produce profound abdominal symptoms, often very difficult to differentiate from abdominal disease. Appendicitis, renal colic, ruptured ulcer, obstruction, mesenteric thrombosis and acute pelvic infection have all been confused with the acutely inflamed gall-bladder.

It is rather hard from statistics to determine just how frequently acute suppurative cholecystitis occurs. Mentzer,[6] in an analysis of 76,902 cases admitted to the San Francisco General Hospital, found cholecystic disease in 1.5 per cent of the cases; of these 17 per cent were acute cholecystitis; 23 per cent were cases of acute gangrenous cholecystitis; of 38 acute gangrenous cholecystitis cases 28 had gallstones. In 8 of the 38 cases the patients had had no previous attack of trouble. Twenty-six per cent of the cases of acute gangrenous cholecystitis died.

Davis[7] reports 158 cases operated upon for disease of the gall-bladder, with 3.75 per cent mortality. Five of the six deaths occurred in advanced gall-bladder trouble or in acute suppurative disease of the gall-bladder.

Sherwood[8] reports 184 operations upon the gall-bladder with 18 deaths, 9.7 per cent. There were 54 acute cases with six deaths, 11 per cent. Four of the six deaths in the acute cases were diagnosed acute suppurative cholecystitis.

Mitchell[9] reports 1,270 cases operated upon, of which 16 were cases of perforated gall-bladder, an incidence of 1.2 per cent. He quotes McWilliams' report of 3,180 gall-bladder operations with 29 cases of perforated gall-bladder, 0.9 per cent; also Karullan's report of 6,114 autopsies with perforated gall-bladder in 1.5 per cent of the cases. His analysis of the various reports of perforated gall-bladder which were operated upon gives a mortality of 50 per cent.

Desplas and Bonnett,[10] who recently reviewed 111 cases of spontaneous perforation of the gall-bladder with operation, gave a mortality of 52 per cent.

McClure[11] reports 700 cases of cholecystectomy among which there were thirteen cases of acute gangrenous gall-bladder and eight cases of acute gangrenous perforation. There were a total of 31 deaths.

From my own work and that of my associates the following statistics were obtained: In 1928-1929 there were admitted to St. Anthony's Hospital 12,012 cases; of these 70 were for cholecystic disease; 14 were for acute suppurative cholecystitis; 2 were for gangrene of the gall-bladder and 4 for rupture of the gall-bladder. There were 5 deaths. In 1928-1929 there were admitted to the State University Hospital 9,963 cases. Forty-six of these were for cholecystic disease; 6 were for acute suppurative cholecystitis; 3 for gangrene of the gall-bladder and 3 for perforation of the gall-bladder. Four of these died.

As is indicated in this review, the incidence of suppurative cholecystitis, while not large, yet is definite and occurs so often that in observing cases of cholecystic disease one must constantly be on the outlook for this condition.

The treatment of suppurative diseases of the gall-bladder is always surgical when the symptoms are characteristic enough to admit of diagnosis. There is an apparent difference of opinion as to when surgery should be instituted. Bruggeman,[12] in a recent article, says:

"The literature of no other abdominal inflammatory condition presents so wide a divergence of opinion among surgeons of experience as to the indication for operation, and among those who advocate immediate intervention there is a marked divergence of views as to the operation of choice."

He believes that immediate operation is rarely indicated. A review of the literature suggests that the English favor an early operation; that the French think it imperative, while the Ger-

mans are inclined to postpone operation until the interval. Among American surgeons the difference of opinion is not real. On analysis they practically all believe that the individual case and its severity must determine not only the time of intervention, but frequently the type of operation to be performed.

Great difficulty will be encountered in differentiating acute cholecystitis from the milder manifestations of acute empyema of the gall-bladder. The cases that often come under observation will subside temporarily, leaving us in doubt as to the true character of the lesion, and these will be the cases in which temporary non-operative management will often enable us to select a better time for accurate diagnosis and for operation. Under abstinence from food, mild opiates, heat to the abdomen and fluid per rectum and intravenously, the symptoms subside. In such a case after a brief interval the ideal operation of cholecystectomy can usually be performed. Operation should not be delayed until another attack. Fowler[13] recently stated the question very clearly. He says:

"There are two classes of cases: those in which we have time to consider whether operation is advisable or not, and those in which operation must be done to save life."

In all cases of a more severe degree, particularly those of the obstructive type, delay is dangerous and operation should be urged as immediately necessary. It is in these cases that it most often proves life saving. Often removal of the gall-bladder cannot be done, and should not be attempted. Conditions found must guide us in our procedure. While cholecystostomy is not ideal, and later operative work is often required after it, yet will tide the patient over, when the technical difficulties encountered in a cholecystectomy would result in a long and dangerous operation. Gibbon,[14] in a recent article, calls our attention to the fact

"that cholecystostomy still has its definite indications and is often a life-saving procedure," and further "that it is absurd to state that cholecystostomy carries with it as high a mortality as cholecystectomy."

My experience and observation lead me to believe that the decision as to the type of operation in acute suppuration of the gall-bladder is very important and often means the difference between relief from the immediate symptoms and an early mortality. Drainage in any case should always be used. Complicating conditions of the bile ducts and complicating conditions of the liver and pancreas makes it further advisable to secure biliary drainage. The early deaths in acute cases often come from acute liver insufficiency induced by prolonged operation, associated cholangitis and the loss of liver heat. Dispatch in doing the work, protection of the liver by artificial heat, and the use of saline and glucose following operation, as pointed out by Mann,[15] will accomplish much in obviating this condition.

In pericystic abscess operation with drainage should always be performed. Removal of the gall-bladder should be done when possible. Technical difficulties may again make its entire removal prohibitive. One may have to be satisfied with the removal of as much permanently destroyed tissue as seems safe. The subperitoneal excision described by Gibson[16] can sometimes be employed successfully.

The mortality will always be high when infection of the gall-bladder is permitted to go to the state of suppurative inflammation. The history will show that most of these conditions are preceded by repeated but definite mild attacks. If we are to avoid desperate situations, early operation should be advised before this state has been reached. I do not mean that every mild case should have immediate operation, but surely these cases should not be permitted to go on indefinitely with repeated disabling attacks that potentially at least are a grave menace to the individual.

It is interesting to note the statistics as to the cause of death in operations on the gall-bladder and to speculate on the number that must have had as a contributing factor a suppurative inflammation.

Stanton,[17] in listing the most common causes of death in 500 cases that died following operation on the gall-bladder, gives the following: peritonitis, 77; lung complications, 53; cardiac failure, 34; pulmonary embolism, 53; operative hemorrhage, 32; hyperpyrexia, 20; bile peritonitis due to perforation, 32; operative shock, 25; renal failure, 24; cholemia without hemorrhage, 22; cholemia with hemorrhage, 20.

Connell[18] reports 186 cases operated upon with 15 primary deaths. The causes were peritonitis, sepsis, septic jaundice, pneumonia, myocarditis, pancreatitis and kidney complication.

Saunders[19] compiles the causes of death as reported by:

(1) Herzreet and Cornel, 400 cases with 37 deaths. The most frequent cause was peritonitis, pneumonia, bronchopneumonia and shock.

(2) Johnson and Pearce, 192 cases operated upon with 12 deaths. Of these, cardiac failure accounted for five.

(3) Judd and Parker, 845 cases operated upon with 12 deaths; causes, cardiac disease, peritonitis, hemorrhage, pulmonary embolism and bronchopnuemonia.

(4) Cave, 470 cases operated upon with 33 deaths; causes, pneumonia, hemorrhage, peritonitis, pulmonary embolism and hyperpyrexia.

Deaver[20] gives the common causes of death in gallstone operations at Lankenau Clinic as cardiac dilatation, embolism and coronary thrombosis. He says pneumonia stands low and hemorrhage rarely occurs. He thinks hepatic insufficiency plays an important part.

At St. Anthony and State University Hospitals, Oklahoma City, in 1928 and 1929, the common causes of death were peritonitis, pneumonia, cardiac complications, hyperpyrexia and pulmonary embolism.

I fully appreciate the fact, as previously indicated, that in the surgical profession there is an apparent wide divergence of opinion as to when operation should be done in acute suppurative gall-bladder infection. Invariably, however, in reviewing the expressed opinion on the subject there is a doubt as to the advisability of delay except in mild cases, which makes it almost unanimous that in the severe types operation is done. I am inclined to agree with Miller,[21] who believes that when the surgeon is confronted with an acutely inflamed gall-bladder the attitude should not be "How long shall I postpone this operation," but rather "Why should I not operate now?"

If it were possible for us to go further and place these lesions from an etiological standpoint into two classes: i. e., first, those having their origin primarily from an inflammatory cause; and second, those secondarily resulting from a primary obstruction to the cystic duct, we might be greatly aided in our decision as to the time of intervention, as in the first class operation might well be delayed for a time, while in the second delay is surely courting disaster. While the history is usually suggestive of one or the other type, the clinical findings are so similar that a differentiation is difficult.

If nature in her ability to wall off inflammation in this region were not so kind, many more serious catastrophes would occur. It finally comes, then, to a matter of judgment in the individual case, which must be based on extreme care in weighing the evidence at hand. Unfortunately the laboratory except for the blood count and urine analysis can be of but little assistance in these acutely sick patients.

There is a wide divergence of opinion as to the type of operation. Here again there can be no set rule. We must often do what we can with least immediate cost to the patient.

## CONCLUSIONS

(1) Acute suppurative cholecystitis is a serious condition carrying with it a high mortality.

(2) It is always a surgical condition and one which requires judgment as to the time of operation.

(3) The type of surgical procedure instituted has an important bearing on the mortality.

## BIBLIOGRAPHY

1. Halpert, Beta: The Gall-Bladder. Arch. Surg., 19:1037, Dec., 1929.
2. Graham, E. A.: Diseases of the Gall-Bladder and Bile Duct. Lea & Febiger, 1928.
3. Walton, A. J.: Some Modern Aspects of Cholecystitis and Cholelithiasis. Lancet, 208:334, 1930.
4. Lahey, Frank H.: Surgical Conditions of the Biliary Tract. Ann. Surg., 90: No. 3, p. 373.
5. DaCosta, J.: Chalmers' Modern Surg., p. 1026, 1925.
6. Mentzer, S. H.: Calif. & Western Med., p. 213, April, 1930.
7. Davis, Byron B.: Operative Mortality and Results in Gall-Bladder Surgery. Ann. Surg., p. 735, May, 1928.
8. Sherwood, Walter A.: Surgical Lesions of the Biliary Tract. Ann. Surg., p. 178, Aug., 1928.
9. Mitchell, Edward D., Jr.: Hidden Perforations of the Gall-Bladder. Ann. Surg., p. 200, Aug., 1928.
10. Desplas and Bonnet: J. de chir., 25:257, 1925.
11. McClure, Roy C.: Postoperative Complications of Cholecystectomy. Ann. Surg., p. 253, Aug., 1929.
12. Bruggeman, H. O.: The Treatment of Acute Cholecystitis. Ann. Surg., p. 433, May, 1928.
13. Fowler, Russell S.: The Surgical Aspect of Biliary Disease. Amer. Jour. Surg., p. 750, April, 1930.
14. Gibbon, John H.: Review of Operations Done on the Gall-Bladder and Ducts. Ann. Surg., p. 367, Sept., 1929.
15. Mann, F. C.: Arch. Int. Med., 30:171-181, 1922.
16. Gibson, C. L.: Ann. Surg., 83:613, 1926.
17. Stanton, E. MacC.: Immediate Cause of Death Following Operations on the Gall-Bladder. Amer. Jour. Surg., p. 1026, May, 1930.
18. Connell, F. G.: Remote Results of Biliary Surgery. Ann. Surg., p. 837, June, 1928.
19. Saunders, R. J.: End Results of Cholecystectomy. Ann. Surg., p. 379, Sept., 1930.
20. Deaver: Mortality and Morbidity in Gallstone Operations. Surg., Gyn. & Obst., p. 308, Sept., 1929.
21. Miller, Richard H.: Acute Cholecystitis. Ann. Surg., p. 647, Oct., 1930.

## DISCUSSION (*Abstract*)

*Dr. Robert K. Buford, Charleston, W. Va.*—The pathology of the gall-bladder as seen by the surgeon is dependent upon three factors: (1) disturbed metabolism of cholesterol and its solvents; (2) infection; (3) obstruction. If these three factors are clearly understood, then the pathogenesis of the lesions, their symptoms and treatment will be logical.

The great majority of all the lesions seen by the surgeon or pathologist are inflammatory.

The acuteness of the lesions is determined by the virulence of the organisms, the disturbance in the blood supply, and the presence of obstruction to the free drainage of the natural duct system. Given a virulent organism producing a rapid edema of the wall of the gall-bladder and cystic duct, or a stone impacted in the cystic duct with thrombosis of the cystic vessels, a

gangrenous cholecystitis will result. A less virulent organism, with no impairment of the blood supply, but with blockage of the cystic duct by edema or a calculus, usually causes an empyema of the gall-bladder. A virulent organism invading the wall of the gall-bladder, but without cystic duct obstruction, will produce a suppurative cholecystitis. Upon the rapidity of the process and the drainage of the cystic duct depends the extent of the involvement of the peritoneal coat and adjacent peritonitis.

Acute gall-bladder disease most commonly occurs as the result of calculus obstruction of the cystic duct with resultant hydrops or empyema, and is more easily recognized than the acute non-calculus gall-bladder, the uncertainty in the diagnosis in most instances being due to confusion with a high-lying acute appendix or kidney infection, as the essayist pointed out. Sometimes a subacute perforated duodenal ulcer clouds the diagnosis, but this is rare since perforated ulcer is not frequently seen. The rapid, board-like rigidity, immobility of the patient and shock are in direct contrast to an acute gall-bladder colic. We see the patient tossing about in bed, complaining of excruciating pain and demanding a hypodermic injection of morphine for relief.

The patient with simple, acute gall-bladder disease will, in practically all instances, recover from the attack without operative interference under the treatment of anatomical and physiological rest.

The diagnosis of suppurative gall-bladder is dependent largely upon the history, the clinical evidence, physical examination and x-ray findings.

In the gangrenous gall-bladder, in the early stage, the symptoms are practically those of the phlegmonous type. The differential factor is that with the onset of gangrene the pain suddenly ceases.

In gall-bladder inflammation, the vomiting is more persistent than in appendicitis, as in the latter it ceases as the pain shifts and localizes in the region of the appendix.

The lower lobe of the right lung is often involved, because the infection travels by way of the lymphatics through the diaphragm.

The van den Bergh direct and indirect reactions differentiate hemolytic from intrahepatic and obstructive jaundice, but do not tell us whether the jaundice is due to a faulty liver or to an obstruction of the ducts. These tests are of little value in diagnosing cholecystitis, though the serum bilirubin affords an accurate means of following the progress of the jaundice before and after operation and guides us as to when to operate. It is not safe to operate with a rising serum bilirubin. The latter should be stationary, or, better still, on the decline.

If cholecystitis is complicated by hepatitis, as indicated by dye retention and a rise in serum bilirubin, drainage is safer than removal.

The end results of gall-bladder surgery are dependent upon early diagnosis and upon operating before serious complications arise in the ducts, liver and pancreas.

*Dr. Arthur White, Oklahoma City, Okla.*—I am not a surgeon, but I am impressed very much by the lack of confidence with which my surgical consultants approach these cases. In the suppurative types of gall-bladder disease it is difficult to determine when suppuration begins.

Many cases of cholecystitis, low grade, chronic and constant, eventually become suppurative. On the other hand, there is another type that shows periodically, possibly, very mild attacks of acute cholecystitis.

We do not consider suppurative cases in the same light as analogous conditions in other parts of the body. For example, with the appendix, surgeons have long followed the dictum that any case of appendicitis seen early should be operated upon. I have often wondered why such a dictum has not been laid down for the gall-bladder.

Certainly in recurring cases, even though they be mild, the gall-bladder should be operated upon before a subsequent attack develops. The condition is often successfully treated by duodenal drainage, but many cases do not respond to this measure.

Those cases not infrequently following pneumonia rarely clear up from duodenal drainage. Should not they be operated upon before this inflammatory process has gone to the point of suppuration?

The surgeon-consultant is the dominant factor in the determination of the treatment of these cases, and I hope that before long some dictatorial, some dogmatic plan may be laid down by him to guide the medical man in the determination of when these cases are surgical.

*Dr. Hubert A. Royster, Raleigh, N. C.*—Some years ago I prepared notes upon the question of whether or not to operate upon the gall-bladder in its acute stages of inflammation. So far I have never had the courage to go ahead and publish or finish the paper. In inflammation of the gall-bladder we are constantly waiting for the acute attack to pass off, to allow the condition to get in the so-called chronic stage. We are sometimes very insistent that we must wait for jaundice to pass off and sometimes it never does. We are afraid that we will get in too early, perhaps, and not find enough pathological tissue to remove.

Acute gall-bladder infections, a short time after the acute attack, offer probably the easiest operative procedure that you are familiar with. In the subacute stage the gall-bladder peels out. It is like removing the interior of a banana from its skin. The adhesions are not firm, not fixed, and in some cases enough immunity has been established to give you no fear. On the other hand, if you wait for several attacks, the adhesions are widespread and dense and difficult to handle.

One of the most eminent surgeons in the country was operated upon last May for gall-bladder disease, having been observed by excellent medical men and surgeons over a period of several months. About the second week he suddenly felt something give way and he was perfectly comfortable. A week later a slow leak was found in the gall-bladder, which formed adhesions to the stomach and duodenum and omentum.

Why should you consider immediate operation during the attack in the case of appendicitis, and in the case of the gall-bladder wait until it becomes chronic, until definite local manifestations have occurred, which make the operation difficult, or until infections in the other parts of the body have been allowed to take place?

*Dr. Robert Caldwell, Nashville, Tenn.*—For a number of years now I have been advocating immediate surgical treatment of the diseased gall-bladder.

We operate upon cases of appendicitis when we make the diagnosis. Why not treat our gall-bladder cases in the same manner? And when we can educate the profession to that manner of thinking, then we shall avoid many desperate cases.

My limited experience in cases of acute gall-bladder disease is contrary to the essayist's. I have not seen many which later suppurated. If we see these cases early, cholecystectomy should usually be done.

As Dr. Royster said, the gall-bladder during an early acute attack slips out generally very easily. There is less raw surface on the liver than in the ordinary case. But we should not wait for the violent attack.

*Dr. Irvin Abell, Louisville, Ky.*—I shall confine my remarks to the particular types which have been considered by the essayist, namely, gangrene of the gall-bladder, perforation of the gall-bladder and diffuse suppurative cholecystitis. Although gall-bladder disease infrequently presents itself as a surgical emergency, these three types may be classed as emergencies, since the indication for operation in each is urgent. The operative procedures we have utilized are cholecystostomy, cholecystectomy and partial cholecystectomy. In the latter operation the gall-bladder is opened from the fundus to the neck, the gangrenous mucosa is removed and drainage of its bed is employed. The operative trauma is considerably less than that entailed by complete cholecystectomy and the ultimate results are satisfactory, two important considerations in determining its field of usefulness. The choice of operation is made upon the general condition of the patient and upon the extent and character of the local disease. It is essential that the operation be fitted to the individual patient rather than to employ a given operation in all cases. Frequently these disasters occur at and after middle age as acute involvements superimposed on long standing disease of the gall-bladder, and in many instances secondary disease in the liver and pancreas and distant degenerations in the kidney and heart muscle add immeasurably to their gravity. In such patients the shorter the operation and the less the trauma, the lower the mortality. Cholecystostomy under local, spinal or gas anesthesia meets these requirements and indications. In the face of extensive adhesions, pericholecystic or hepatic abscess, marked swelling and edema about the common duct and subacute pancreatitis the operation which requires the least manipulation to give adequate drainage is the safest one. When the general physical condition of the patient is good and the local pathological condition not too extensive, gangrenous and suppurative gall-bladders may be removed with reasonable safety, employing either complete or partial cholecystectomy. Surgical judgment is a most important factor in determining the character and extent of the operation and the mortality. In those cases in which cholecystectomy can be done the convalescence is a smoother one and the future outlook a brighter one, since the gross lesions will have been wholly or largely removed. Following either type of operation glucose and fluids in large amounts intravenously or subcutaneously are not only beneficial but essential.

*Dr. Horace Reed, Oklahoma City, Okla.*—Systemic infections which exhibit general symptoms may, after a few days, appear to localize in the gall-bladder region. The origin of the infection may be the appendix or some other remote structure. Surgical attack upon the gall-bladder would not be indicated under such circumstances. Such a condition might be comparable to the acute gynecological infections which probably most of us occasionally see.

An infected uterus, whether or not there is associated tubal involvement, is not properly surgical, if for no other reason than the existence of a parametric infection. An acutely diseased gall-bladder which is the result of systemic infection will probably be associated with an involvement of the liver, bile ducts and even the pancreas. Surgery under such conditions would be dangerous. The differential diagnosis between such a gall-bladder and an acute obstructive cholecystitis is not always easy. When the history indicates, and physical signs point definitely to obstruction, with infection originating primarily in the gall-bladder, then we may be sure we have a surgical condition.

*Dr. G. V. Brindley, Temple, Tex.*—It is a question whether surgery should be advised for the first attack of a mild acute cholecystitis. I do not believe that there are many doctors here who would consent, personally, to cholecystectomy for such a condition. Gall-bladder infection is a sequence to some other disease and in reviewing our own work we found that a gall-bladder infection nearly always followed either an acute respiratory infection, typhoid fever, lower abdominal infection or pregnancy. These are the chief conditions that precede a gall-bladder infection.

Frequently a patient will have a mild cholecystitis following a severe attack of influenza or violent sore throat. It does not seem rational to believe that gall-bladders with such a short history of infection, unless it be of a violent degree, should be considered immediately surgical. It has been our custom first to try medical management for such patients.

Cholecystitis has been compared with appendicitis and it is true that there is, in many ways, a resemblance. Our statistics show that a gall-bladder seldom perforates, while an acute appendix frequently perforates. Our staff sees a case of perforated appendicitis on an average of every five days. During the last five years we have operated upon 362 patients for perforated appendicitis. During the same period of time we operated upon 387 patients for cholecystitis and I do not believe that there were more than eight with a perforation of the gall-bladder among this number. Should not these statistics impress us with the fact that the acute gall-bladder does not perforate as does the acutely inflamed appendix? Considering these facts, I think it can be understood why it is right to handle the patient with an acute cholecystitis expectantly for a short time.

The activity or the virulence of the infection tends to die out in a short time and, also, the patient develops an immunity to his infection. These facts tend to make the patient safer for surgery after the acute symptoms have subsided.

Out of the 387 patients who were subjected to a cholecystectomy, practically all were operated upon

after the more acute symptoms had subsided. There was a mortality of ten patients or 2.6 per cent.

*Dr. F. J. Kirby, Baltimore, Md.*—It is a good axiom that a diseased appendix is better out of the body. The same might be said of the gall-bladder.

Disease of the gall-bladder frequently manifests itself in early life, around the age of ten or twelve years. When children refuse the ordinary staple foods it is evidence of this condition.

Infections in the gall-bladder come largely from the upper respiratory tract. Colon bacilli gain entrance to the gall-bladder from the intestines by way of the cystic duct.

Chronically diseased gall-bladders, as a rule, are in stout people, the disease usually existing for some years, with a history of recurring attacks. Many patients have associated myocardial changes and the upper abdomen, especially the right side, is a delicate place to work in.

In empyema of the gall-bladder, where there are dense adhesions and a thick gall-bladder, it may be very difficult to remove the gall-bladder safely, especially from fat patients over fifty years of age, with associated heart and kidney degeneration, and marked fever.

It is safer to place ice caps over the diseased gall-bladder, put the patient in the Fowler position and fill him with fluids for a few days until the kidneys and heart functions improve. Then operation with the least amount of anesthetic and with due care in handling tissue will bring much less shock to the patient. By operation upon the gall-bladder, either removal of it or drainage, we do not cure the patient. He still has some indigestion and constipation, and many lack sufficient hydrochloric acid in their gastric juices, and still have certain changes which have taken place in the liver and liver cells. These patients should be directly under the care of the physician for several years after operation.

*Dr. Howard (closing).*—I wonder what influence the use of spinal anesthesia in operating upon these cases is going to have on certain of the causes of death which are too frequent today. Statistics which are rapidly being made will answer that question.

Wilkey recently classified appendicitis into two main groups, the inflammatory group and the obstructive group. The same classification might be applied to the gall-bladder. Could we develop the ability to recognize which type we are dealing with, the correct management would be much easier to decide.

Comparison of the appendix with the gall-bladder may be objected to, yet the study of the inflammatory appendix will give much information that may be applied to the gall-bladder.

Decision to operate upon gall-bladder cases is often delayed until the patient is in trouble. The mortality under these circumstances will always be high. A decision as to operation is not always easy. An endeavor should be made to anticipate complications before they occur, and by proper prompt surgery to prevent them.

## RETROBULBAR NEURITIS*

*By* ROBERT J. WARNER, M.D., F.A.C.S.,
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Much has been written upon retrobulbar neuritis, and many differences of opinion as to its etiology and terminology exist.

By the term retrobulbar neuritis we mean the symptoms of dimness or rapid loss of direct vision associated with central scotoma and usually having a normal peripheral field. There is usually pain upon moving the eye ball. External examination is usually negative; sometimes there is a slight exophthalmus. The ophthalmoscopic picture in the early stages is negative and in the later stages a slight blurring of the disc margin or engorgement of the retinal veins may exist. Usually only one eye is involved, and many cases recover without treatment.

Inflammation in the orbital part of the optic nerve is called retrobulbar or axial neuritis, while the intraocular form is described as intraocular or peripheral neuritis. The intraocular neuritis is divided into exudative neuritis and papilledema.

Retrobulbar neuritis must be distinguished from a descending neuritis which likewise affects the retrobulbar segment of the nerve, but ultimately also extends to the disc. Descending neuritis extends to the external portion of the nerve, while the retrobulbar neuritis is limited to the axial portion and is called axial neuritis.

Ball says this disease is to be differentiated from suddenly discovered congenital amblyopia and from hysteric amblyopia. Since definite ophthalmoscopic changes are absent in recent cases of retrobulbar optic neuritis, the diagnosis must rest on other symptoms and particularly on the way vision is affected. While in a few cases of retrobulbar disease complete blindness may come rapidly, in most instances the blindness is limited to the central area of the visual field, which is supplied by the papillo-macular bundle of fibres. Hence, a central scotoma is present. According to Duane, the central scotoma of optic nerve disease differs from one due to a central choroiditis or neuritis in this:

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in the former no change is apparent in the size or shape of objects in or near the scotoma (retinal metamorphopsia), and the first colors to disappear are red and green. In the primary disease of the macular, distortion of objects (retinal metamorphopsia) is often present, and a scotoma for blue develops prior to that for red or green (Mauthner).

Retrobulbar neuritis is either acute or chronic in its development. Many causes for this condition are mentioned. The most common ones are: posterior sinus diseases, multiple sclerosis, Leber's disease, diabetes, and multiple foci, such as teeth, tonsils, and sinuses. It may follow facial paralysis. In many cases no cause can be assigned.

The close relationship between the posterior sinuses and the optic nerve is considered by some to be the chief cause of retrobulbar neuritis. The disease may reach the optic nerve by (1) direct spread of inflammation; (2) by pressure due to distention of the walls of sinuses; and (3) by the irritating influence of toxins causing edema and stasis.

Van der Hoeve states that enlargement of the blind spot, first for colors and later for white, is the first sign of retrobulbar neuritis of nasal origin. He thinks that this is always the precursor of a central scotoma, which may occur in cases in which serious disturbance of vision develops. Other frequent symptoms of retrobulbar neuritis, as mentioned by Starr, Cutler and others, include enlargement of the blind spot, central scotoma for colors, exophthalmos, swelling of the upper lid, dysfunction of the extraocular muscles, ptosis, variation in the size and reaction of the pupil, monocular or occasionally binocular impairment of vision, pain and tenderness in the orbit, and ophthalmoscopic appearances varying from the normal to engorgement and tortuosity of the retinal vessels with slight pallor of the disc.

Loeb, in his dissection of the optic nerve and paranasal sinuses, described the optic nerve as passing externally from the chiasm along the roof or lateral wall of the sphenoid sinus, usually in slight relation with the last posterior ethmoid cell and then to the eyeball through the orbit, in the optic canal. The dural sheath of the optic nerve is transformed into the periosteum of the canal. The nerve is therefore enveloped only by the delicate sheath which in most places is attached to the periosteum.

Onodi demonstrated specimens which show that the optic nerve can pass unprotected by any bony shield through an ethmoid cell or even through the sphenoid sinuses, whereas on the other hand the nerve is often surrounded by a thick bony wall. The anatomic relation, therefore, may be a great factor in determining whether or not the optic nerve will be attacked.

Herzog feels that retrobulbar neuritis from nasal disease is a relatively rare condition. He reports 75 cases of retrobulbar neuritis, divided into two classes. The first includes patients who came primarily for the eye symptoms; the second includes patients who came because of the nasal condition. Of the 28 patients who came because of the eye symptoms, twelve showed a possible cause aside from the nose. Of these, none recovered completely under the nasal treatment and only two were improved. Of the 16 who were negative on physical examination, treatment of the nasal condition gave complete recovery in 9, and partial recovery in 4 cases. In a series of 500 cases of acute and chronic nasal infection, only 9 per cent showed any evidence of a central or paracentral scotoma. In this group were 13 cases of ocular disturbance without evidence of other than nasal disease as a cause. Ten of these patients recovered completely under nasal treatment, one partially recovered, and two showed no change.

Herzog emphasizes the necessity of careful physical examination, and also of remembering the possibility of early multiple sclerosis.

White, who has written extensively on this subject for some years, formerly believed that this infection reached the optic nerve from some infectious process in the adjacent sinuses, either by direct continuity or by way of the blood stream. Recently he has arrived at the conclusion that the frequency of the optic nerve disturbance from sinus diseases is insignificant as compared with the frequency with which it is affected from other foci, including diseased teeth, tonsils, appendix and gall-bladder. The bacteria may be compared with emboli loosened from the place of origin and carried into the blood stream to the smallest and often terminal vessel.

Wilmer states that the relation of disease of the paranasal sinus to axial neuritis is especially confusing and that it is considered negligible as a cause by some physicians, and the chief factor by others.

Beck studied 91 cases of indisputable empyema of the accessory sinuses and found only one case of retrobulbar neuritis among them.

Statistics of many authors have proven beyond doubt that multiple sclerosis may be an important cause of retrobulbar neuritis. Traquair

considered multiple sclerosis as a cause of retrobulbar neuritis in from 20 to 40 per cent of the cases; Marburg 50 to 55 per cent; Wilmer 11 per cent; and Davis found 14 cases of multiple sclerosis in 76 cases of retrobulbar neuritis.

According to Henson, the central scotoma in disseminated sclerosis is very fleeting and never causes a scotoma of longer than three months' duration. In disseminated sclerosis axial neuritis may appear later in the disease, but again it may be the symptom that brings the patient to the physician.

In Leber's disease the central field defect is generally round or oblong in shape, occasionally irregular. It is absolute and permanent in character.

In both disseminated sclerosis and Leber's disease the patients are young and nervous, and mental defects may be present. The family history, the sex, and the constant absolute central scotoma in Leber's disease are helpful in making a differential diagnosis.

Rehsteiner asserts that hereditary atrophy of the optic nerve was first described by Leber in 1871 and is therefore sometimes designated as Leber's disease. The disturbance is hereditary, but the persons affected with it usually have normal eyes and vision in early life. In the second or third decade, visual disturbances develop which are progressive for some time and then remain stationary. Leber discovered the hereditary character of the disease. It was also noted that it occurred more frequently in men than in women. In one family, the sisters of the men who were affected transmitted the disease to their offspring, whereas they themselves did not contract it.

Rehsteiner reports the result of the anatomic examination of a patient who was affected with hereditary atrophy of the optic nerve. Up to the age of 39 the patient had had normal vision. Then visual disturbances developed suddenly, and examination revealed a scotoma which, in the course of the following months, gradually affected a larger area. The two eyes were affected in almost the same manner. However, the periphery of the visual field was unimpaired. The patient died several years later of intracranial hemorrhage. Microscopic examination of the optic nerve revealed a primary atrophy of the nervous elements and a proliferation of the neuroglia. The arrangement of the connective tissue likewise showed marked changes. The pathologic conditions in the bulbus oculi were less severe than those in the optic nerve, but an atrophy of the ganglion cells was noted in the central part of the retina. The location of the atrophic parts in the retina and in the optic nerve indicated that the atrophy affected mainly the papillomacular bundle.

I wish to report the following case of acute retrobulbar neuritis secondary to post-nasal sinus disease:

M. Y., a white woman, age 20, was first seen July 18, 1930. Her chief complaint was poor vision of the right eye for the past three days. She had slight pain on pressure on the eyeball. She stated that she could see only out of one corner of her eye.

Her mother, father, two brothers and two sisters had normal vision.

She had had a tonsillectomy one year previously, and an acute cold one week previously.

External and intraocular examination of the eyes showed the right eye to be normal. The field of vision contained a large absolute scotoma of all fields except the lower temporal quadrant. There was slight tenderness on pressure on the eyeball.

The left eye had vision 20/20. All examinations were normal.

Blood Wassermann and urinalysis was reported as normal.

The patient was referred to Dr. Hasty for intranasal examination.

On July 23, 1930, five days after the first examination, the patient had no light perception in the right eye. On July 24, Dr. Hasty opened the posterior ethmoid and sphenoid. On July 26 the patient had vision of hand motion at one foot, and on July 28 hand motion at 15 feet. The field of vision to form was normal. The vision gradually improved and on September 15, 1930, two months after onset, the patient had 20/20 vision.

The intraocular examination had remained negative throughout this time, and the vision and fields of the left eye remained normal.

*Intranasal Report of Miss M. Y. Made by Dr. Hasty.*—The left side of the nose is obstructed in the upper portion by swelling of the middle turbinate. The mucous membrane is rather congested. The right side is obstructed in the upper portion by acute congestion of the middle turbinate. No secretion is seen in the nose. The teeth and gums are apparently in normal condition. The tonsils have been successfully removed. The pharynx is rather granular. There is some secretion in the nasopharynx. By transillumination, the right antrum and frontal are darker than the left. The difference is marked.

X-ray examination shows the left frontal sinus slightly larger than the right. Both are small and clear. The left antrum is somewhat larger than the right and clear. The right antrum has possibly some thickening of the membrane across its base. In the ethmoids, the left cell walls are possibly thicker than normal. The right cell walls are thicker than normal. The posterior cells are somewhat cloudy. In the sphenoid there is a central cell opposite the end of the nasal septum which seems to extend toward the base of the brain. It is surrounded by six other cells. The bony walls of the central cell and the adjacent cells are all thickened. There is possibly a shadow in the anterior portion of the central cell suggestive of a polyp. No other evidence of disease is made out.

Dr. Hasty believed from his examination and the x-ray films that there was possibly a posterior eth-

moiditis on the right. Likewise, there was possibly some involvement of the central sphenoid cell.

*Operative Findings.*—In the right ethmoid the cell walls were thick. The anterior cells did not seem to be diseased. The middle cells had a thickened membrane, possibly some fluid. The posterior cell contained polypi and fluid. The central sphenoid cell showed polypoid degeneration and fluid.

The postoperative diagnosis was chronic disease of the middle and posterior ethmoid cells and of the central cell of the sphenoid group.

*Postoperative Notes.*—About one week after the operation two polypi appeared in the region of the posterior ethmoid cells. These were removed and they have not reappeared. For some six weeks there was some drainage of pus from the central sphenoid cell. Three months after the operation there was no drainage from the sphenoid and the region of the ethmoid was covered over with mucous membrane.

BIBLIOGRAPHY

Van der Hoeve, J.: Ann. Otol., Rhin. & Laryng., 31: 297, 1922. Arch. Ophth., 51:210, 1922.
Herzog, H.: Retrobulbar Neuritis. Arch. f. Augenh., vol. 99, 1928.
Wilmer, W. H.: Chronic Retrobulbar Neuritis. Tenn. State Med. Jour., Sept., 1930.
Rehsteiner, K.: Schweiz. med. Wchuscher., 60:122, Feb. 8, 1930.
Beck: Monatschr. f. Ohrenh., 57:225, 1923.
Onodi, K.: The Optic Nerve and the Accessory Cavities of the Nose. Ann. Otol., Rhin. & Laryng., 17:1, 1908.
Stark, H. H.: Retrobulbar Neuritis Secondary to Disease of the Nasal Sinuses. J.A.M.A., Aug. 27, 1921.
Cutler, C. S.: The Optic Nerve in Sinus Disease. Laryngoscope, July, 1922.

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DISCUSSION (*Abstract*)

*Dr. A. L. Bass, Louisville, Ky.*—There is a variety of opinions as to the etiological factor of retrobulbar neuritis. Professor Plenck, of the University of Budapest, called attention to the nasal origin of defective vision in 1783. In 1817 J. Beer in his book suggested as causes "the vicarious amaurosis of a suppressed cold lacking any noticeable retention of mucus in the frontal sinus; also the relationship between nasal inflammatory processes and the effect on the optic nerve."

A great many of you have recently attended the Academy meeting in Chicago and had the pleasure of hearing Professor Grosz's excellent paper relative to this malady. Two of the most common causes not mentioned in Dr. Warner's paper are alcohol and tobacco. Professor Grosz, in his report of statistics from his eye hospital in Budapest, where he has had an average of 22,598 new patients annually, found approximately 100 cases every year, 60 per cent of which were due to excessive use of alcohol and tobacco and 15 per cent of which were of nasal origin.

Too much credit cannot be given to Van de Hoeve for calling our attention to the enlargement of the blind spot which is characteristic of the disease. Markbreiter found it in 70 per cent of his cases. A central color scotoma, whether it is progressive or not, with a normal fundus, should immediately put us on our guard that there is an interference of the papillomacular fibers in the retrobulbar area; and we should consider these cases as emergencies, make a complete examination as rapid as is consistent with safety; find out the cause, believing there is a cause for everything, and remove it as soon as possible, if possible. We know the longer the condition exists the greater is the likelihood that there will be irreparable damage to the papillo-macular fibers.

It is the consensus of opinion that the important etiological factors in acute retrobulbar neuritis are diseases of the paranasal sinuses and multiple sclerosis; while the chronic form is due to alcohol and tobacco, chiefly, also lues, diabetes and lead poisoning. Heredity as a factor was discovered first by Leber in 1871.

I recall being present when White read his original paper on retrobulbar optic neuritis, in which he reported a number of cases due to sinus infection. He later concluded that optic nerve disturbance due to sinusitis was negligible as compared to involvement from other causes.

I have had cases of retrobulbar neuritis due to alcohol, tobacco and paranasal sinus infections.

*Dr. William D. Gill, San Antonio, Tex.*—Infection, especially in the ethmoidal and sphenoidal sinuses, is, we believe, of considerable importance.

Properly made x-rays are absolutely necessary for the correct interpretation of disease in the ethmoidal and sphenoidal sinuses. The mild cases of retrobulbar neuritis are easily overlooked, and we may fall into the error of considering a patient as neurotic or hysterical or just a difficult patient to handle, when in reality he has a serious eye disorder. The number of patients with retrobulbar neuritis that one sees is a good index to the thoroughness of his methods of examination. You will recall that atrophy of the optic nerve is a not infrequent sequel of retrobulbar neuritis, and its importance must not be minimized.

A sign of considerable importance in retrobulbar neuritis is failure of the pupil to respond to direct light stimulation or failure of the pupil to maintain contraction under direct light stimulation. Direct light stimulation is considered by some authorities to be most important as a differential diagnostic sign. The field studies establish the diagnosis definitely.

Transitory amblyopia is an important sign of brain tumor, and when in patients complaining of transitory amblyopia we can rule out retrobulbar neuritis, we should go further into the case.

*Dr. W. Likely Simpson, Memphis, Tenn.*—When the physician has decided that the sinus is acting as an etiological factor, and when he is going to do an operation, there is a very much better way to approach the sinus than intranasally, and that is by the external operation. This is especially important if the ethmoid is large, extending all around the optic nerve, and we all recognize that the type of sinus disease which causes neuritis is in the posterior ethmoid and sphenoid and one really could not expect the eye to get well if he opened the anterior ethmoid by removing the anterior end of the middle turbinate. In draining the posterior ethmoids and sphenoid I like much better to follow the external route, to be sure that I have opened and drained all these sinuses.

*Dr. F. E. Hasty, Nashville, Tenn.*—The involvement of the optic nerve as a result of disease in the paranasal sinuses may be caused by an abnormality of the sphenoid or ethmoid cells; in other words, a dehiscence

or near dehiscence of bone over a cell lying near the optic nerve. When such a cell is diseased and drainage is obstructed and pressure develops from within, the weakest wall will give way, and if this happens to be in the direction of the optic nerve it will cause direct pressure. I do not doubt that the lack of satisfactory results in certain cases has been due to an inadequate exenteration of the ethmoid and sphenoid cells. I have found it helpful to exenterate the cells to such an extent as I feel safe, then to place a pledget of cotton saturated with lipiodol with a thread tied to it in the location where I feel uncertain of the adjacent structures and have another x-ray plate made. The lipiodol will serve as a marker. This additional information enables one to get a new orientation of the structures and serves as a guide in completing the operation. Surgery should be complete, but it is dangerous to proceed when one is not quite sure of his location. In fact, if one is not sure of his location, he should discontinue his operation.

*Dr. Clifton M. Miller, Richmond, Va.*—One of the things in the past that used to be considered in connection with paranasal sinus disease as a causative factor in retrobulbar neuritis was tobacco and alcohol. I have not seen a case that I was satisfied was caused by tobacco alone, and only two cases by alcohol alone. It was always a combination of the two. It is somewhat doubtful whether the intestinal intoxication is produced by over-indulgence in alcohol or tobacco; in other words, whether something else would not produce intestinal intoxication besides tobacco and alcohol.

None of the gentlemen, although they all know it as well as I do, brought out what is to me the most impressive of the early symptoms, and that is that the central scomota for red is out of all proportion to the central scomota for form. This, to me, in primary examination of the case is most significant.

Tobacco and alcohol are liable to cause bilateral paranasal sinus disease, but when we find sinus disease in a patient who has indulged in tobacco and alcohol over a long period, look for all the other things that might cause it, too. While we have the patients under control, and very much frightened about their vision, they will submit to any examination, and we should make them realize the danger from these causative factors.

*Dr. George W. Botts, Norton, Va.*—I feel we are wasting a great deal of valuable time when we search outside of the sphenoid for the etiological factor in retrobulbar neuritis. In about 79 per cent of the cases the underlying cause will be found within this cavity. Open the sphenoid and then you may take your time and look elsewhere for what might be a factor in producing retrobulbar neuritis.

While I was associated with the late Dr. Ross Hall Skillern, of Philadelphia, we saw a great many cases of retrobulbar neuritis. In every case we opened the sphenoid, establishing perfect drainage and aeration. Then the oculist went over the case with us to see if there were any other factors in the etiology of the retrobulbar neuritis.

Unless you have positive assurance that the trouble is not within the sphenoid cavity, it is best to go into the sphenoid before trying to locate any other cause.

## THE CEREBROSPINAL FLUID PRESSURE IN NORMAL AND PATHOLOGIC STATES*

*By* A. L. Skoog, M.D.,
Kansas City, Mo.

While the cerebrospinal fluid, and especially the choroid plexus, was known to such ancients as Herophilus, Galen, Vesalius and others, it is only during very recent years that we have made practical clinical use of the scientific discoveries concerning this secretion. For details relative to important recent studies of this liquid, one may be referred to the works of Magendie, Luschka, Falkenheim and Naunyn, Sicard, Mestrezat, Cushing, Weed, Ayer, and others. But above all of these for our purpose we are interested historically in Quincke, who in 1872, while doing some research upon the physiology of the cerebrospinal fluid of animals, took note of the pressure. Nineteen years later he published his first report on lumbar punctures in pathologic human cases. Thus we frequently run across in the literature the term Quincke puncture. Quincke described his water manometer, modifications of which continue to be used successfully. After some years of quiet, interest was resumed in the studies of spinal fluid, especially for the diagnostic value of its bacterial, cellular and serological changes. The physical side has received appropriate attention only during the past few years. Even now I fear that too little attention is given accurate physical observations of the fluid while it is being obtained and immediately after. Now a complete spinal fluid analysis means making accurate note of pressure states, chemical content, cells, serum, and bacteria.

Among the many body secretions and mobile liquids about which we have more or less accurate knowledge, the cerebrospinal fluid is one of the most interesting ones. The only other liquids in the body which in any way resemble it are to be found within the eyeball and internal auditory organ.

The essayist here wishes to make only a few brief statements, not to present all the details of the origin and disappearance of the liquid. We believe that it is a true secretion of the choroid plexus cells. There are definitely two

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types of cells in the choroid plexus, the large, prominent outer ones being responsible for the production of the cerebrospinal fluid. This theory is well sustained by much clinical and experimental data. The gland tissues are most abundant in the lateral ventricles, but are also present in the third and fourth. Possibly a very small amount of fluid originates from the ependyma cells and those lining the subarachnoidean spaces. A few investigators hold that it may appear by dialysis. The liquid can be secreted very rapidly, from a few hundred to one thousand c. c. in twenty-four hours being reported. Thus in normal and pathologic cases large quantities may be removed and more or less completely replaced within a few days.

It has been questioned whether there is a real cerebrospinal fluid circulation like that of the blood stream. A systematic and continuous flow of the fluid in one direction does not seem to exist. However, there is adequate evidence both clinical and experimental that rather rapid movements of the fluid take place, directed either caudad or cephalad. The liquid not only finds its way out of the ventricles through the foramina of Magendie and Luschka into the cisternae of the encephalon and cerebral as well as spinal subarachnoidean spaces and lumbosacral sac, but it may return to its place of origin, and probably also into the canalis centralis of the spinal cord, where the upper portion usually is patent. Quincke, Sicard, Weed and others have injected insoluble, inert materials within different subarachnoidean loci and ventricles and watched the wanderings of the particles. These experiments have been carried out on animals as well as fresh cadavers.

It is interesting to note at the spinal puncture in normal individuals the oscillations of the top of the column of the manometer. One may even count accurately the respiration and pulse rate thereby more readily by using the water manometer. Accordingly, to summarize, I would state that the cerebrospinal fluid movements are those of oscillation forward and backward rather than a perfect circulation.

We should be primarily interested in the physiology of cerebral and spinal fluid pressures. It is established that there is a difference in pressure when the needle is in a ventricle, in the cisterna magna or the lumbosacral sac. It becomes more proximate with a horizontal or similar level. The normal readings for a ventricular puncture are comparatively lower. The same holds for the cisterna magna, contrasted with the lumbar. Pfaundler concluded that there were four important factors that account for the pressure recorded by a spinal lumbar puncture as follows: (1) a compression pressure resulting from that contained within the fluid itself; (2) the pressure transmitted from the vascular circulation; (3) hydrostatic pressure; and (4) the elastic pressure derived from the elasticity of the subarachnoidean walls. Seemingly the fourth is the most important. The second can be demonstrated readily from pulse rate oscillation when using especially the aqueous manometer if compression is applied at either one or both of the jugular veins. The compression pressure might be interpreted as resulting from the other three rather than as a lone factor.

At this stage we might discuss briefly the methods for obtaining pressure readings on the cerebrospinal fluid, especially those observed at lumbar puncture, where most diagnostic fluids are obtained. To try to estimate this without some special recording apparatus is uncertain and at times even hazardous. Several pitfalls might be mentioned. Three representative types of instruments are employed. (1) Clinicians using the tambour and an attached scale may be seen most frequently in France and Italy. The manometer, invented by Claude, is a good representative of this type. There are some obvious objections to its use. (2) Several varieties of mercury manometers have been used. The Fleischer is one used extensively in this country. It occasionally gets out of order, and at times is expensive to repair. After it has been used in connection with a case of meningitis it may be difficult to sterilize completely. It is convenient to carry around. (3) To Quincke is given credit for developing our modern interest in lumbar punctures. He was especially attracted to the problems of pressure, and devised a simple aqueous manometer. Modifications of this continue to be used throughout the world. The water manometer, including the needle with mandarin, rubber connectors and glass tubing graduated in millimeters, can readily be sterilized. The instrument has decided advantages for recording low pressures, and pulse and respiratory oscillation.

The normal lymphocyte count and the normal pressure of the spinal fluid as recorded at a third lumbar puncture, have not been conclusively determined. In my discussion of this subject I shall use water manometer figures only. They may be reduced to a mercury read-

ing by dividing by 13.6. Consulting the literature of a great many authorities, we find that figures varying from 40 to 300 mm. are given as normal. In very young children the pressure is considerably less than that for the adult. I believe there is quite a wide normal range. This may be recorded at about 90 to 150 mm. for a grown person. It varies somewhat with the posture of the patient at the time the puncture is performed. I select two postures for practically all of the lumbar punctures. In the recumbent posture I try to have the spine as nearly horizontal as possible. This would leave the external occipital protuberance on a level with the midline of the third lumbar space. For the sitting posture the patient is bent forward with his arms pressing against a folded pillow placed over the abdomen. This leaves the spinal column bent forward considerably and the head bent forward, but not in such a position as to make the patient uncomfortable nor to compress the veins in the neck emerging from the skull. I try to have the patient in a composed mental state and fully relaxed. Besides organic factors, many physiologic ones may increase to some extent the normal readings. Various strains such as fear, holding the breath, coughing and sneezing may alter it considerably. It is possible that some of the high maximum figures of pressure may be based upon errors not perceived at the time of the puncture, as well as clinically unrecognized pathologic states within the cranial or spinal cavities.

Several physiologic factors thus may alter the lumbar spinal fluid pressure to some extent. One single clinical experiment will be related briefly to illustrate the effect of psychic factors.

A physician has been punctured many times over a period of some years for diagnostic purposes and also as a therapeutic measure to relieve tabetic pains. During a few third lumbar punctures, using the seated posture, I have tested the possible influence that mental activities might have on the water manometer readings. After all was quiet and the column was stabilized, the patient would be swayed by suggestions relative to sleep. Then after an appropriate interval of time a difficult mathematical problem was given for rapid solution. Invariably an elevation of 15 to 30 mm. was produced by this method. This intelligent medical man made a good neurological witness.

A normal third lumbar fluid pressure depends upon a good continuity throughout the entire subarachnoidean system as well as a normal ventricular system with its communications. The fluid is secreted by the choroid plexus cells within the ventricles and must escape through the subarachnoidean spaces to be absorbed probably at several different places. Even a mild subacute or chronic meningitis or sclerosis resulting from pia-arachnoidean inflammations may interfere with the normal absorption of the cerebrospinal fluid. These facts make it necessary to be somewhat cautious about stating what are the absolute maximum normal figures for spinal fluid pressure.

Abnormally high pressure may be recorded from a variety of intrinsic pathologic states involving the central nervous system. There is an elevation where brain bulk is increased such as from inflammation, encephalitis, tumors, internal hydrocephalus, hemorrhage, abscess, vascular thromboses, epilepsy, cerebral traumas, alcoholic delirium and uremia. Either excessive production or considerably diminished absorption may produce an increased reading. Brain tumors, internal hydrocephalus and tuberculous meningitis account for most of the very high pressure readings, ranging from 600 to 1,000 mm. Nearly all types of cerebrospinal syphilis frequently will produce an increase of the total quantity of the fluid and tension.

Abnormally low spinal fluid pressures are observed much less frequently than abnormally high. In cases of low pressure we think first of spinal cord tumors and localized subarachnoidean cysts involving the spinal cord. It is quite obvious when we bear in mind the anatomy of the spinal cord, its membranes and the spinal canal that a tumefaction need not be very large before it gives rise to obstruction for the cerebral fluid to enter the lumbosacral cistern. And as a practical fact we find that most cord tumors early give rise to a special spinal fluid syndrome. One of the main features in this is a low spinal fluid pressure ranging all the way from 0 to 50 mm. and a barrier against exchanges above and below the obstruction. The removal of but a very few c. c. will reduce a possible reading of 50 to 0. Again, bilateral compression of the jugular vein usually produces little or no rise in the third lumbar area. Where there is no marked obstruction to the fluid in the spinal subarachnoidean spaces a rather prompt rise of 40 to 100 mm. may be noted. Frequently this is referred to as the Queckenstedt sign. Studies in hydrostatics of the spinal fluid have greater diagnostic value than the combined use of lipiodol and x-rays. Probably another most frequent cause for low pressure readings may be errors in technic. A nerve root, changing the position of the needle,

a blood clot within the cannula and other things may give rise to erroneous interpretations. Fainting, dependent upon a cerebral anemia will lower the pressure considerably. Quite an uncommon cause would be destruction or sclerosis of the choroid plexus. The writer has recorded one such case.

This 57-year-old man died from cerebrospinal and general vascular syphilis, after being under observation in the hospital for six weeks. The lumbar punctures within five days of each other revealed a pressure of less than 50 mm. The removal of less than 5 c. c. of spinal fluid each time reduced the pressure to nil. The autopsy showed an unusually interesting state involving the choroid plexus. There was a destruction of a large quantity of the choroid plexus cells and a subsequent sclerosis of this organ in all the ventricles. The plexus tissues underneath the secreting cells showed gummatous formations and areas with dense round cell infiltration and sclerotic tissues. This case gives strong support to the theory that the function of the choroid plexus cells is to secrete cerebrospinal fluid.

Spinal drainage is advocated by a number of clinicians for many diseases involving the brain, spinal cord and meninges. No one advises this measure alone to relieve the patient. I have found it quite valuable as an aid in the treatment of selected cases of cerebrospinal syphilis, including especially tabes and paresis, brain tumors, several types of meningitis, acute poliomyelitis, encephalitis, epilepsy, carefully chosen brain traumas, alcoholic deliriums, disseminated sclerosis and some other more uncommon neurologic disorders.

RESUME

(1) Caution should be exercised by medical men in the technic of taking spinal fluid pressure readings, recording and evaluating them.

(2) Cerebrospinal or ventricular fluid may be removed for diagnosis, therapy alone, or frequently for a combination of the two.

(3) For some patients where the cerebrospinal nervous system is possibly involved, a careful recording of spinal fluid pressure is exceedingly important. It can be determined accurately only by the use of a reliable manometer.

(4) There are some cases where it is indicated to perform simultaneously either the cisterna magna or lateral ventricular puncture with that of the lumbosacral sac. Then manometer readings at the two loci are quite essential.

REFERENCES

Ayala: Ueber den diagnostischen Wert des Liquordruckes und einen Apparat zu seiner Messung. Ztschr. f. d. ges. Neurol. u. Psychiat., 84:42, 1923.

Ayer: Spinal Subarachnoid Block. Arch. Neurol. and Psychiat., 7:38, 1922.

Bard: Le role de la pression dans l'action physiologique du liqueur cephalo-rachidien. J. de Physiol. et de Pathogen., 17:171, 1917.

Cushing: Studies on the Cerebrospinal Fluid. Jour. Med. Research., 31:1, 1914.

Dandy: The Space Compensating Function of the Cerebrospinal Fluid. Bull. Johns Hopkins Hosp., 34: 245, 1923.

Dercum: The Functions of the Cerebrospinal Fluid with a Special Consideration of Spinal Drainage and of Intraspinal Injections of Arsphenamized Serum. Arch. Neur. and Psychiat., 3:230, 1920.

Falkenheim and Naunyn: Ueber Hirndruck. Arch. f. exper. Path. u. Pharmakol., 22:261, 1887.

Fremont-Smith and Kubie: The Relation of Vascular Hydrostatic Pressure to the Cerebrospinal Fluid Pressure. The Intracranial Pressure in Health and Disease, p. 104. New York: Hoeber, 1929.

Jackson: The Management of Acute Cranial Injuries by the Early, Exact Determination of Intracranial Pressure and Its Relief by Lumbar Drainage. Surg., Gynec. & Obst., 34:494, 1922.

Kafka: Untersuchungen zur Frage der Entstehung, Zirkulation and Funktion der Cerebrospinalflussigkeit. Zeitschr. f. d. g. Neurol. u. Psychiat. Orig., 15:482, 1913.

Kubie: Intracranial Pressure Changes During Forced Drainage of Central Nervous System. Arch. Neurol. and Psychiat., 16:319, 1926.

Luschka: Die Adergeflechte des menschlichen Gehirns, Berlin, 1855.

Magendie: Memoire sur un liquide qui se trouve dans le crane et la colonne vertebrale de l'homme et des animaux mammiferes. Memoire 2, Jour. de Physiol. Exper., 7, 1927.

Mestrezat: Le liquide cephalo-rachidien, Paris, p. 76, 1912.

Pappenheim: Die Lumbalpunktion, Wien, 1924.

Pfaundler: Ueber Lumbalpunktionen an Kindern. Jahrb. f. Kinderh., 49:264, 1899.

Queckenstedt: Zur Diagnose der Ruckenmarkskompression. Deutsche Zeitschr. f. Nervenh., 55:324, 1916.

Quincke: Zur Physiologie der Cerebrospinalflussigkeit. Arch. f. Anat. u. Physiol., 1872.

Quincke: Die Lumbalpunktion der Hydrocephalus. Berl. klin. Wchnschr., 9: No. 38, 1891.

Schlaffer: Ueber den Bau und die Function der Epithelzellen des Plexus Chorioideus. Beitr. z. path. Anat. u. z. allg. Path. (Ziegler's) Festschrift fur Prof. Julius Arnold, p. 101, 1905.

Sicard: Le liquide cephalo-rachidien. Paris, 1902.

Skoog: Cerebrospinal Fluid Pressure. J.A.M.A., 69: 1064, 1917.

Weed: Studies on the Cerebrospinal Fluid. Jour. Med. Research, 31:21, 1914.

Weed: The Cerebrospinal Fluid. Physiol. Rev., 2: 171, 1922.

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DISCUSSION (*Abstract*)

*Dr. H. R. Unsworth, New Orleans, La.*—I was particularly impressed yesterday at the clinical meeting held in the Louisville City Hospital by the absence of use of spinal puncture for diagnostic purposes. In numerous cases presented that were operated upon there were pathological states which simulated neoplastic conditions. I should like to ask Dr. Skoog whether he does not think that a spinal puncture should be almost a routine in neuro-psychiatric diagnosis.

*Dr. Walter J. Otis, New Orleans, La.*—The frequency of lumbar puncture headaches interested me very much, taking me back to the World War days when one particular unit, following lumbar punctures, was susceptible to headaches. In this unit we found that directly following puncture, by elevating the foot of the bed as best we could in those days, together with the administration of 10 grains of aspirin every four hours and a cup of some hot liquid, in the majority of cases there were no evidences of headache. This, to the present day, is my practice following lumbar taps. The headaches are practically nil when this is done.

*Dr. Chas. R. Rayburn, Norman, Okla.*—The importance of taking the spinal fluid pressure accurately and routinely at the time of neurological examination, providing there are no contraindications, cannot be stressed too much. While the pressure reading itself may not be of much diagnostic value, it may give the examiner some idea of what may be taking place in the nervous system. There are many factors that have to be taken into consideration in taking the readings, such as the relaxation or contraction of the patient's muscles, the position of the patient, the size, angle, and position of the needle.

Dr. Skoog did not emphasize those factors which help to vary the pressure. The cerebrospinal fluid and cerebrospinal axis are all within the closed dural sac. The pressure readings depend upon the ratio of the capacity of the dural sac and its enclosed contents. Except in brain tumors and a few other conditions, the solid content of this sac is constant and the increase in the cerebrospinal fluid pressure is usually due to an increase in the quantity of fluid. And here we come to the principle thing which helps to form the fluid, the choroid plexuses. There has been much done on hyper-liberation of the fluid, which gives such states as hydrocephalus and cerebral edemas. There has been very little reported on the hypo-liberation of the fluid. I think the field of secretory or liberating power of the choroid plexuses is worthy of investigation. Perhaps a pathological condition brought about by hypo-liberation of the fluid gives a certain stasis. Perhaps this might explain some of the functional disorders of the central nervous system. There may be some relation between the disturbed function of the choroid plexus and the metabolism of the brain tissues.

*Dr. Walter Freeman, Washington, D. C.*—In doing a spinal puncture, the needle is pressed in among the roots of the cauda equina, and if one of these roots happens to occlude the cannula we may get all stages between the normal flow and none. By rotating the needle we can sometimes increase the flow four or five times. A second factor which may influence spinal pressure readings is that when the manometer is used it is not connected with the needle until several drops of the fluid have escaped. In conditions in which the brain is swollen, the amount of fluid is decreased, and the escape of a few drops will throw off our calculations to a very great degree.

I would like to ask Dr. Skoog whether he places any reliance in the quotient of the cerebrospinal fluid pressure as first brought out by Ayala.

The information derived from a study of the hydrodynamics of the spinal fluid is equal in value to that derived from chemical studies. Readings of pressure should be routine in diagnostic lumbar puncture.

*Dr. J. J. Gable, Norman, Okla.*—I wonder whether Dr. Skoog has had any deleterious after effects from spinal drainage in the treating of acute alcoholism. It has been our experience in the Central Oklahoma State Hospital that spinal drainage in alcoholics of all types causes rather severe headaches which last from a period of four or five days to a week or two. The headaches have been much more severe in these cases than in the average run of spinals.

*Dr. Skoog (closing).*—Dr. Freeman brought to our attention the fallacy of relying on the drop method for estimating spinal fluid pressure. I have had many experiences such as Dr. Freeman cited, and a number of instances where a root was blocking only partially. In such a case you may be led into serious errors where there may be slower dropping than you would expect.

I have never used the Ayala index, but I discussed the procedure with de Ayala in Rome about two years ago, and he is quite enthusiastic about it. I think it has some value.

As to serious results, including headaches, after spinal drainage of alcoholics, I would warn about the dangers in delirium tremens, where there is a mortality rate in the neighborhood of 25 per cent. In delirium tremens the patient may not be able to tell us about his headaches.

The so-called lumbar puncture headaches occur much more frequently in neurotic types of individuals than in patients with organic disease of the brain. In paresis and some other types of neurosyphilis I have seldom observed headaches following lumbar punctures. I take several precautions before doing a lumbar puncture. Preferably a puncture should be done in a hospital where the patient can recline for twenty-four hours or more. Test the patient by allowing him to sit up several times for increasing periods to be assured that headaches will not occur after the discharge. Occasionally repetitions of returning to bed may have to be continued as long as one week. There are a number of theories of the cause of lumbar puncture headaches. I believe the more slowly the fluid is removed, the less likelihood of a development of serious lumbar puncture headaches.

I wish to emphasize the therapeutic value of lumbar punctures in many diseases of the central nervous system, especially in delirium tremens.

Dr. Unsworth discussed the performance of lumbar punctures where brain tumor exists. Anyone who has reviewed the literature of spinal fluid work is acquainted with the numerous deaths recorded following punctures, especially where the posterior fossa is involved.

In reviewing many thousand lumbar punctures which I have performed, I find none where I could attribute a death directly to this procedure. It is exceedingly important to make a clinical neurological diagnosis before attempting either a diagnostic or therapeutic spinal puncture. I either avoid a lumbar puncture where a tumor in the posterior fossa is suspected, or do it very cautiously. I recall some brain tumor cases where headaches and other annoying symptoms were relieved considerably by spinal drainage.

# CESAREAN SECTIONS IN HOUSTON, TEXAS: A STATISTICAL STUDY*

*By* ROBERT A. JOHNSTON, B.S., M.D., F.A.C.S.,
*and*
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At a joint meeting of the Staffs of the Baptist Hospital and the St. Joseph Infirmary at Houston, Texas, in the fall of 1926, an analysis of the cesarean sections performed in these institutions for the years 1924, 1925 and 1926 was made and a report given. The review of the preceding years was undertaken in order to compare our results with those in other parts of the country and to ascertain how one might profit from one's former experiences. This report showed that in 3,632 deliveries, 107 (corrected 104) cesarean sections were performed, or approximately one in every 36 cases. Such an incidence seems rather high when one takes into consideration the scarcity of contracted pelves in private practice. A maternal mortality of 18 was rather alarming. However, in two cases the operation was performed post mortem and in one instance an abdominal pregnancy was erroneously included. With these corrections one still finds a maternal mortality of 14.4 per cent, or one death in every 7 cases. A closer study of these deaths revealed some illuminating facts, as shown by *Chart I.*

Chart I

Series A

1924-1925-1926

CESAREAN SECTIONS

| Indications | No. Cases | Maternal Deaths | Foetal Deaths |
|---|---|---|---|
| (1) Toxemia | | | |
| (a) With convulsions | 16 | 5 | 4 |
| (b) No convulsions | 13 | 0 | 1 |
| (2) Placenta previa | 17 | 1 | 2 |
| (3) Abruptio placentae | 5 | 1 | 3 |
| (4) Dystocia | | | |
| Pelvic and fetal | 48 | 8 | 4 |
| (5) Post mortem | 2 | 2 | 2 |
| (6) Abdominal pregnancy | 1 | 1 | 1 |
| (7) Miscellaneous | 5 | 0 | 1 |
| Total | 107 | 18 | 18 |

During this three year period there were 36 maternal deaths on the obstetrical services of the two hospitals and in 50 per cent of these cases cesarean section was performed. At this joint meeting of the two staffs each headings was reviewed and the following comments were made. In the 29 toxemic cases, there occurred five maternal deaths and a like number of infants were lost. The maternal deaths occurred in the 16 cases having convulsions, while only one infant and no mothers were lost in the 13 cases without convulsive seizures. A general anesthetic was used in every case and it would seem that a maternal mortality of 31 per cent would hardly be warranted in eclamptic cases. These results seem appalling, yet similar results were obtained in New Orleans in eclamptic cases delivered by cesarean section.

In the 17 cases of placenta previa, the one maternal death resulted from peritonitis and it was found that this patient was examined at home and three times in the hospital before delivery. The saving of 15 children in this series is gratifying. In the 5 cases of abruptio placentae, there occurred only one maternal and 3 fetal deaths. Toxemia of pregnancy was associated with each case of abruptio placentae as an underlying cause and in dealing with this tragic condition one should remember that hysterectomy is sometimes necessary to control bleeding. In the cases of dystocia, the opportunity for improvement seemed most marked, for in 48 such cases there were 8 maternal deaths. In 7 instances the mortality was attributed to peritonitis or septicemia, while one case died on the fourteenth day of pulmonary embolism. J. Whitridge Williams in "A Critical Analysis of 21 Years' Experience with Cesarean Sections" shows conclusively that the hazard to the patient is increased by manual manipulation, vaginal examinations, rupture of membranes, and duration of labor. In every case of death the patient had been examined many times *per vaginam*, and labor had lasted from 10 to 36 hours. It was also noted that the classical type of operation was done in every case except two. The Porro operation was employed with success in these two cases. Neale Davis, in further study of these cases, states:

"In the City of Houston from 1924 to 1926 there were 107 cesarean sections done at two hospitals. The patients came from the private practice of general practitioners, general surgeons and obstetricians of the city. The mortality in these operations was 14.4 per cent. A small group composed of physicians specializing in obstetrics, and of surgeons closely associated with them, performed 56 consecutive cesarean sections with a mortality of 1.8 per cent. Fifty-one of the 107 patients were operated upon by a group of recognized surgeons and physicians in general practice, with a mortality of about 33 per cent."

*Read in Section on Obstetrics, Southern Medical Association, Twenty-Fourth Annual Meeting, Louisville, Kentucky, November 11-14, 1930.

Since this report three years have elapsed, and it might be of interest to compare more recent results with those already reviewed.

### INCIDENCE

There was a notable increase in the number of deliveries at each hospital during the past three years and the percentage of cesarean sections is shown by *Chart II.*

Chart II

BAPTIST HOSPITAL

| Years | Del. | Ratio | C.S. |
|---|---|---|---|
| 1924, 1925, 1926..... | 2010 | 1 in 39 | 53 |

ST. JOSEPH INFIRMARY

| Years | Del. | Ratio | C.S. |
|---|---|---|---|
| 1924, 1925, 1926..... | 1622 | 1 in 32 | 51 |

Total: 3632 deliveries; 104 cesareans; Series A.

BAPTIST REPORT OF STAFF MEETINGS, ST. JOSEPH

| | | | | | | |
|---|---|---|---|---|---|---|
| 1927 | 934 | 1 in 72 | 13 | 743 | 1 in 68 | 11 |
| 1928 | 1006 | 1 in 22 | 45 | 672 | 1 in 45 | 15 |
| 1929 | 1198 | 1 in 26 | 46 | 765 | 1 in 32 | 24 |
| Total | 3138 | 1 in 30 | 104 | 2180 | 1 in 43 | 50 |

5318 deliveries; 153 cesareans; Series B.

There were 5,318 deliveries at the two hospitals and 154 cesarean sections, or approximately one operative delivery in every 35 cases. Whether the reading of the report was responsible for a marked decrease in the number of cesareans at both hospitals during the succeeding year or this marked decrease was merely a coincidence, the fact remains that the year 1927 saw fewer cesarean sections than during any previous or following years. Since then there has been a gradual increase in cesareans, which is true in every part of the country.

### MATERNAL MORTALITY

There were 155 cesarean sections performed at the two hospitals during the three year period, but one abdominal pregnancy was erroneously included, giving a corrected number of 154. Nine mothers upon whom this operation was performed lost their lives, but one case should be omitted because the patient had a thrombosis of the cavernous sinus. Since she was moribund, the procedure was successfully employed to save the child. Therefore, we have a maternal mortality of 8, or 5.2 per cent, which is an improvement over the preceding period with a mortality of 14.4 per cent. A statistical study of cesarean section throughout the country shows a maternal mortality ranging from 2 to 6 per cent, so it is hoped that the future will see an improvement in the results at Houston.

Chart III

TOXEMIA

| | 1924-26 | 1927-29 |
|---|---|---|
| (1) Number of cases | 20 | 35 |
| With convulsions | 16 | 17 |
| Without convulsions | 13 | 18 |
| (2) Fetal deaths | 5 | 5 |
| (3) Maternal deaths | 5 | 1 |
| With convulsions | 5 | 0 |
| Without convulsions | 0 | 1 |

### TOXEMIC CASES

There were 35 cases of toxemia of pregnancy which were delivered by cesarean sections, and only one maternal death, or a mortality of 2.8 per cent, in contrast to a mortality of 17.2 per cent in the first series. The case lost was a preeclamptic and death was due to peritonitis. There were 17 cases which had convulsions and 18 without convulsions. Twelve cases having convulsions were delivered under spinal anesthesia, one had ether, and in four cases ethylene was employed. Four children died shortly after delivery and one was stillborn and macerated. It is believed that this marked improvement in the second series of eclamptic toxemia is due to the use of spinal anesthesia or rather to the abandonment of any general anesthetic in severe toxemic cases. This bears out the work of Stander, who showed experimentally that any general anesthetic produces blood changes similar to those found in eclampsia. This also explains the excellent results obtained by De Lee in toxemic cases delivered by cesarean section under local anesthesia. In several cases of eclampsia, premature toxic children were delivered under spinal anesthesia and survived. It is believed that a general anesthetic would have been fatal to these children. It is our belief that excellent results can be obtained for both mother and child in toxemic cases with convulsions by employing cesarean section under spinal or local anesthesia. At the same time, one must realize that each case must be individualized, and fully appreciate that good results can be obtained in a large number of cases of eclampsia by use of morphine, glucose, magnesium sulphate, sodium amytal and other measures. The consistency of the cervix and the size of the infant should aid one in determining the course to pursue in effecting the delivery.

Chart IV

| | Cesareans | Maternal Mortality | Fetal Mortality |
|---|---|---|---|
| Series A | 17 | 1 | 2 |
| Series B | 14 | 2 | 2 |

### PLACENTA PREVIA

In the six years, there were 31 cesarean sections for placenta previa with three deaths, resulting in each case from infection. We have been taught wisely that every case of free ante partum bleeding in the latter part of pregnancy should be sent to the hospital immediately for diagnosis; also that vaginal examination should be made most cautiously and one should be in readiness for the control of hemorrhage. It is known that infection is more prone to occur due to the proximity of the placental site to the internal cervical os, as well as to anemia in these cases. If one has ever observed a profuse hemorrhage on examining these cases, such precautions will be appreciated. In the hands of surgeons, placenta previa most probably can best be treated by cesarean section, while a well trained obstetrician can individualize each case, obtaining equally good results by the use of Voorhess' bags, packing and Braxton-Hicks version. Twenty-seven children were alive fourteen days after delivery in this series.

### ABRUPTIO PLACENTAE

In 8,950 pregnancies studied there were only 9 cases of abruptio placentae, or approximately one in every 1,000 cases. Shock was the cause of death in the two fatal cases and toxemia of pregnancy was the underlying cause in all cases. Realizing how frequently such cases are associated with toxemia of pregnancy and also how firmly the uterus contracts when spinal anesthesia is used, the advisability of employing spinal anesthesia should be considered. Four children survived in this series.

### DYSTOCIA

In the first study, it was stated that the greatest improvement would be expected in dystocia cases and such an assumption was borne out, for in 51 cases there occurred only 3 deaths (5.9 per cent) in contrast to a previous mortality of 16.3 per cent. The same disregard for the contraindications of cesarean section (long labor, numerous vaginal examinations, rupture of membranes, and so forth), while not so widespread, still exists, for in each fatality in Series B, as well as in all but one case in Series A, the patient had been in labor for a number of hours and had been examined several times *per vaginam*. In reviewing the case records, our experience coincided with that of Thompson in finding rather incomplete histories. There seemed to be an utter lack of records of pelvic measurements, except for a notation that the pelvis was contracted. When one realizes that 75 per cent of the patients with contracted pelves have spontaneous deliveries, the justification of operative delivery might be questioned. It was an exception rather than the rule to have the diagonal conjugate and the transverse diameter of the outlet recorded. A disregard for such important measurement must be due either to incompleteness of the records or to a disregard of their value. In funnel pelves, no record was found that the anterior and posterior sagittals, as well as the antero-posterior diameter, were taken into consideration. The authors feel that pelvimetry is most important, and accuracy in estimating dystocia can be obtained only by its application over a number of years. A check can be made on one's indication in dystocia cases by comparing the biparietal and sub-occipital diameters of the child's head immediately after delivery with the conjugata vera. At the post partum examination, remeasuring the pelvis should justify one's procedure.

In border line or doubtful cases, rectal should take the place of vaginal examinations, and vaginal instillation of mercurochrome should be employed if the duration of labor is prolonged. Observance of such precautions allows cesarean section to be performed with much less risk after a test of labor and the employment of the low type of cervical section will give better results, as shown by Winters in a study of 4,450 cesarean sections. It may be noted that in 29 cases where the low cervical section was done, one death, due to shock, occurred. In all the cases of all groups in the six years where death was due to peritonitis or septicemia, the classical type of operation was performed.

DYSTOCIA

| | No. Cases | Mothers Lost | Infant Deaths |
|---|---|---|---|
| Series A (1924-26) | 48 | 8 | 4 |
| Series B (1927-29) | 51 | 3 | 3 |
| Total | 99 | 11 | 7 |

### MISCELLANEOUS

In this group of cases, one finds how the profession has widened the indication for cesarean section in actual practice. C. Jeff Miller, in a study of cesarean section in New Orleans, found that the indications are legion. Our analysis shows that besides extensive repair operations, breech and transverse presentations, there are listed as indications the following:

"Failure to dilate, desire for living child, hydrocephalus, appendicitis at eighth month, death *in utero*, desire to be sterilized."

Fortunately in this series of 25 cases during the past six years, there occurred no mortality in the mothers. It may also be of interest to note that in the first three years there were only 7 cases of repeated cesareans, while in the past three years this number has increased to 18. With such an increasing number of cesarean sections all over the country, the responsibility of the profession in caring for cases in their future pregnancies will assume an enormous proportion. This brings up the question of sterilization. The records show that 20 cases had the Fallopian tubes resected and in four instances a hysterectomy was performed. Except in the feeble-minded or where pathological conditions exist, one should stress the undesirability of a one-child marriage, and by so doing, one "keeps his obstetrical conscience clear," as Williams advises. There occurred only two cases of rupture of the uterus after cesarean section in the six years, and both mothers survived, but the infants were lost.

Cesarean section was primarily employed in the interest of the child, but one finds that 30 children were lost in this series of 260 cases, or approximately 11.5 per cent. The question naturally arises whether cesarean section is indicated as often in cases of placenta previa and eclampsia, since Gauss has shown how few patients have second pregnancies after having had one cesarean. He shows that "a marriage in women in whom sections are done produces only 1.8 children, whereas it should be 3.46 children."

## CONCLUSIONS

From a review of these statistics one may draw several conclusions. First, we can say that while the contraindications for cesarean section are well known, the profession at times tends to ignore them, with a resulting increase in morbidity and mortality. Second, when this increase is called to the attention of the profession there follows almost immediately an improvement in results. Third, these figures indicate that the ultimate well-being of the patient depends less on the surgical skill of the operator than on the obstetrical judgment he displayed before picking up his scalpel. Fourth, we believe that the avoidance of general anesthesia in the treatment of eclamptic patients is a distinct advance, and is reflected in a lowered mortality for both mother and infant. Finally, there is a general increase in the number of sections being done in this locality.

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## DISCUSSION (*Abstract*)

*Dr. Edward Speidel, Louisville, Ky.*—There is no doubt that too many cesarean sections are being performed. It is very difficult even for experts to decide whether or not this procedure is necessary, particularly in cases of moderately contracted pelvis. In our patients at the City Hospital I am satisfied that we have been very conservative. Nature will pass almost anything through a pelvis if it will mold. I have had babies born with distorted heads through an extremely contracted pelvis, so the fact that the baby was born through the pelvis is not proof that it should have been born through that pelvis. It may be born with cerebral hemorrhage or other injury. The only way of telling definitely is to allow the patient to have full dilatation and the second test of labor for a time. If this is not successful, then the only possible procedure is a low cesarean section.

*Dr. Cyrus H. Maxwell, Morgantown, West Va.*—I lose many babies, but mostly premature ones, but some that I lose would have been saved had a cesarean section been done. In my early practice there were no available surgeons to help me out. But since pituitrin and more modern methods have come into use these difficult labors are minimized. Cesarean sections should be used when needed, but I feel sure that the expert surgeon is allowed to do cesarean section in cases in which a little patience would have brought forth a child normally.

*Dr. W. R. Cooke, Galveston, Tex.*—In the teaching hospital of the University of Texas there were 2,049 deliveries by the obstetric teaching staff. In this series of viable births there were 31 cesarean sections. The mortality was zero.

As you see, the total mortality for the City of Galveston was 9 per 1,000; for the John Sealy Hospital 2.2 per 1,000. The cesarean sections accounted for over half of the maternal deaths, which is distinctly higher than for the United States in general.

Who is responsible for the deaths in cesarean section? The hospital staffs, the students, and what we may call Group A of the general practitioners, deserve more credit than any one else. Those three groups have a lower mortality in obstetrics than any groups I am familiar with. When we come to the midwives, the Group B of general practitioners, and the general surgeons who perform cesarean section, we have a different picture. Upon looking into the question, I have become more and more convinced that the midwife is a better obstetrician than the Group B practitioner. Many Group B practitioners never scrub their hands, never wear gloves. I have heard men get up and make these statements publicly and be applauded for them. In spite of the fact that some of them do scrub their hands and some wear gloves they practice poor obstetrics. They examine the patients too frequently. The midwives do not do that so much. They do not do version nor high forceps, and they do not injure the patients nearly so often.

## FULL - TERM EXTRA - UTERINE PREGNANCY WITH BOTH MOTHER AND BABY LIVING AND WELL*

*By* E. V. CALDWELL, M.D.,
Huntsville, Ala.

L. E., colored, age thirty-seven years, married seventeen years, was of slight build, but had been strong and healthy all her life until six months before coming to the hospital for operation.

She had had three pregnancies. The first, soon after her marriage, resulted in a miscarriage at three months. The second followed soon after the first and went to full term with a normal pregnancy and delivery of a normal baby, which is living now, fifteen years of age. There was no other conception for fourteen years, when she missed her menstrual period in February, 1930, and progressed with such little discomfort that she did not realize she was pregnant, but thought that she was going through the menopause. In the latter part of May, 1930, she became ill and was treated by a local physician for three weeks, who recommended the removal of a tumor. I was called in, and upon examination reported that she was three months pregnant and should be let alone. (I did not recognize the ruptured ectopic which had evidently taken place three weeks previous to my visit.)

I heard nothing from her until October 28, 1930, when I was called again and found a living baby floating around in the abdomen. I sent her to the hospital, did a laparotomy and found the membranes ruptured and the baby free in the abdomen. The baby was delivered and lived. The placenta was attached to the left cornu of the uterus and the left tube and ovary and broad ligament for two-thirds of its area and to the sigmoid over the other third of its area.

The left tube and ovary and cornu of the uterus were removed with that part of the placenta attached and the other third stripped from the sigmoid. There was considerable hemorrhage from the sigmoid and a pack was placed over this area and brought out through the abdominal incision and allowed to remain for four days, when it was removed and the patient had a rapid recovery. A fecal fistula occurred from the sigmoid, which persists slightly at this time. The mother is at work on the farm and the baby is doing well at this writing, six months after delivery.

In searching the literature I found only 121 cases of this type in which the mother and baby both lived and did well. This makes the one hundred and twenty-second.

*Received for publication June 7, 1931.

## HAY-FEVER AND ASTHMA DUE TO RED CEDAR (JUNIPERUS VIRGINIANA) AND TO MOUNTAIN CEDAR (JUNIPERUS SABINOIDES)*

*By* I. S. KAHN, M.D., F.A.C.P.,
*and*
EMMA M. GROTHAUS, TECHNICIAN,
San Antonio, Tex.

In the State of Texas, midwinter hay fever and asthma due to the pollen of mountain cedar (*Juniperus sabinoides*) is exceedingly common. It is just as highly important a factor in this section as the ragweeds of the Central, Northern and Eastern states. Its pollination season usually extends for some eight weeks after the onset in early or mid-December.

During a trip to Florida two years ago, the attention of one of us (I. S. K.) was attracted to the large number of cedars in northern Florida bearing a close resemblance to the *Juniperus sabinoides* of Texas.[1] This growth was identified for us as *Juniperus virginiana* by Professor Cody, of the Agricultural Department of the University of Florida. In early February, 1930, pollen plates mailed us through the courtesy of Dr. Herbert E. White, of St. Augustine, showed cedar pollen in enormous quantity. The question then naturally arose as to the potential hay-fever-asthma producing possibilities of this local Florida growth and its cross specificity relationship with the Texas mountain cedar.

For the purpose of determining this, during the 1930-1931 cedar hay-fever season, some fifteen intradermally positive skin test mountain cedar cases were tested in our office in an identical manner, in addition, with an extract of similar strength of *Juniperus virginiana*, kindly furnished us by Dr. John P. Henry, of Memphis, and all fifteen, without exception, reacted positively identically to this red cedar as to the mountain cedar.

For corroboration, Major S. W. French, M. C., U.S.A., of the Hay-Fever-Asthma Department of the Station Hospital, Fort Sam Hous-

*Received for publication April 1, 1931.

ton, kindly tested six of his mountain cedar hay-fever cases also with this red cedar extract, finding the same reactivity results in all.[2] Similar parallel identical reactivity results with this red cedar extract were also obtained by Dr. J. H. Black, of Dallas, in the ten of his mountain cedar cases tested with both of these cedar extracts.[3]

Five cases of mountain cedar hay-fever were then treated coseasonally intradermally by us with this extract of red cedar, which as far as we know grows not at all or only scantily in Texas, all giving definite local reactions during the course of treatment, and all giving perfectly satisfactory clinical relief, results identical with what conjecturally would have been secured with the same dosages of our usually used mountain cedar extract.

In 1930, Dr. T. Z. Cason, of Jacksonville, Florida, secured a strong positive reaction with our Texas mountain cedar extract on a winter Florida hay-fever case, and secured subsequently an excellent clinical result by preseasonal desensitization of this Florida red cedar case by the use of Texas mountain cedar extracts.[4]

Dr. John P. Henry has recognized and treated red cedar hay-fever in and around Memphis.[5] Dr. B. G. Efron, of New Orleans, also recognizes this *Juniperus virginiana* as a cause of winter hay-fever and asthma in his community. In 1931, four of his cedar cases reacted practically identically with extracts of our Texas mountain cedar.[6]

This office has seen cases of late winter hay-fever and asthma in San Antonio positive to our local cedar, with previous symptoms during the pollination of the red cedar in Mississippi and Florida. Several asthma patients from our Northern states, whom we have seen in San Antonio after failure to improve in Florida, were found sensitive to our cedar on arrival here, and immediately improved when this detail was attended to.

Dr. J. H. Black,[7] of Dallas, has already reported identical cross reactivity between the Texas cedar and the Port Orford cedar (*Chamaecyperis lawsoniana*) of the Pacific Coast, so that this finding of further cross reactivity with the red cedar is not particularly surprising.

The practical importance of this subject lies in the fact that Northern pollen cases, especially those due to the fall ragweeds, frequently take on cedar sensitivity in Texas and also in Florida, and this factor, as well as early grasses and other trees, will have to be taken into consideration in hay-fever and asthma cases spending the winter in northern Florida and the Gulf states, over many portions of which the red cedar has a profuse growth. A related species, *Juniperus barbadensis*, growing in southern Florida and the West Indies, has not yet been worked out.

The pollination season of red cedar in the South extends from January through March, varying somewhat in different localities.

REFERENCES

1. Kahn, I. S.; and Grothaus, Emma M.: Tree Pollen Hay-Fever and Asthma in the South. Sou. Med. Jour., 23:658-662, July, 1930.
2. Personal communication.
3. Personal communication.
4. Personal communication.
5. Personal communication.
6. Personal communication.
7. Black, J. H.: Cedar Hay-Fever. Jour. Allergy, 1:71-73, Nov., 1929.

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## EDITORIAL DEPARTMENT

**SOUTHERN MEDICAL ASSOCIATION**
**Twenty-Fifth Annual Meeting**
**New Orleans, Louisiana, November 18-20, 1931**

### NEW ORLEANS, NOVEMBER 18-20

For the professional man past thirty, time rushes by like a waterfall. It seems scarcely a month since the Louisville meeting of the Southern Medical Association, although eight and a half months have passed. The three and a half remaining months before the next meeting will fly before one is aware. Plans should be made now to attend the New Orleans gathering, which gives promise of being the best yet arranged by the Association.

In this city, one finds first of all a medical profession surpassed by none in the Southern territory, and with it a complete and variegated supply of clinical material. The large population of New Orleans, the numerous ships which touch its port, its many industrial activities, and its reputation as a medical center enable it to offer clinics unequalled elsewhere in quantity and variety. Its two medical schools, Tulane and the new Louisiana State Medical School, and its postgraduate schools, as well as the outstanding non-academic men of the city, insure the proper handling and exposition of the clinical material for visiting physicians.

Every attempt will be made to present a well rounded and complete program, without omissions of useful new developments, and with particular emphasis upon the more practical of the modern methods. The section meetings, general meetings, and scientific exhibits will contain food for thought for the general practitioner, for the man who specializes within narrow limits and for the recent medical student. The meeting will be limited strictly to three days, and the three days will be filled full of pleasurable and profitable undertakings.

The most delightful time to visit this charming old city of New Orleans is in the month of November, when the weather is neither too hot nor too cold, but milder and more comforting than that in nearly any other part of North America.

### PATHS OF THERAPY SINCE 1915

The principles of anesthesia and of asepsis, which properly belong in the late Nineteenth Century, made possible the great modern development of surgery. The period of Osler was characterized by advancement in bedside observations and post mortems. What have been the most productive paths which medical research has traveled in the past sixteen years? From what types of work and groups of workers have come the outstanding practical methods in use today? What lines of labor have produced most definite progress in the treatment of the common conditions which the internist meets?

A survey of the modern methods of internal medicine might classify them according to the laboratory studies which have been the source of practically all of them, under four main heads.

#### CHEMOTHERAPY

First among the producers of therapeutic weapons of this century one thinks of the chemists. Attempts at chemotherapy, at what Paul de Kruif[1] calls the search for a magic bullet, which should enter the human body and seek out one particular bacterial foe to destroy him, or the synthesis of chemicals for a specific therapeutic purpose, began with Paul Ehrlich. Ehrlich, after experimenting with six hundred and six compounds, produced salvarsan, for syphilis, which attacked the *Spirocheta pallida* within the human host without damaging the rest of the body, and wrought untold good in the control of a dangerous and highly communicable malady. Following this successful beginning, it seemed momentarily possible to find a specific

1. De Kruif, Paul. Microbe Hunters. New York: Harcourt, Brace & Co., 1926.

chemical for the cure of any ailment. It seemed to be merely a matter of patient application of the new technic before all bacterial and tissue foes should be vanquished. Chemists have since tried innumerable dye and heavy metal combinations for the destruction of as many animal parasites. Among the rich jewels discovered in the chemical laboratory have been the chaulmoogra oil derivatives which have been purified for the treatment of leprosy, Dakin's solution and other antiseptics, and of course the further elaboration of arsenic and heavy metal compounds for syphilis. Success in the chemotherapy of infections and healing of diseased tissue has not been startling, however. The yield of synthetic chemistry in the medical field has been on the whole much less than its promise. It has not come up to the high hopes of the original students.

### DIETOTHERAPY

The information which has led to the control of another large group of diseases has come from another class of workers, with quite different methods and technic. These are the biochemists, who have provided the modern understanding of nutritional diseases, and the realization in general of the effect of quality of food upon tissue development. They arose at a time when it seemed necessary to eat only calories, or heat units. They showed how readily a food may satiate the appetite without permitting normal growth or maintenance. They demonstrated that inorganic materials, such as iodine, copper, iron and calcium, and complex organic substances active in incredibly small quantity, could prevent many known clinical syndromes; that the lack of a fraction of a milligram a day of certain food materials, vitamins, meant the difference between normality and disease. Goiter, anemia, xerophthalmia and other infections, beri-beri, scurvy, rickets, sterility, probably pellagra, are produced by the absence of imperceptible quantities of food materials.

Vitamin G, the last discovered vitamin, is said to aid in the preservation of the characteristics of youth, so that one might search for the fountain of youth in the consumption of this vitamin.[2] There are possibly many essential organic substances necessary in minute quantities besides the six known vitamins. Recently, Funk and his co-workers[3] have suggested the existence of a specific substance which prevents a small dog from losing with a characteristic train of symptoms the end of his tail.

It is always to be hoped that the chronic degenerative diseases, high blood pressure and nephritis, certain cardiovascular diseases, kidney and gallstones, may be prevented by dietary measures; and there is evidence to support the value of vitamins in many disorders of unknown etiology. In fact, nutritional studies can now very fairly in themselves offer the possibility of alleviation of most human woes. The biochemist's field may eventually usurp the rest of the field of medicine, so that physicians will need no other weapon than the dietary one.

### INVISIBLE LIGHT

An entirely different set of therapeutic agents has come from the workers who often seem most remote from medical progress, the physicists. These have pictured an hypothetical substance, the ether, filling all space, constantly vibrating in waves of an infinite number of lengths. Most of these cannot be seen, heard, touched, tasted, or smelled, but react mysteriously and powerfully with living and inanimate matter. Light is now pictured as a spectrum beginning with very long waves and continuing down to waves of a fraction of a thousandth of a thousandth of a millimeter, in size. The longest known wave, the Hertzian or radio wave, which may be a mile long, can transmit sound round the world with the speed of light. Much shorter than the Hertzian waves are the infra red, or heat waves, and below these comes the brief spectrum of visible light, waves of the same type as the radio or ultraviolet or x-ray, with the specific physiological effect of stimulating the human retina. The visible spectrum contains the well known red, orange, yellow, green, blue, and violet waves in decreasing order according to their frequency. Beyond the visible spectrum, in still shorter waves, imperceptible to the eye, is the ultraviolet region. A portion of these waves is said to be active in healing open tuberculous lesions, possibly in the healing of all wounds.[4] The shorter portion of the ultraviolet is the portion which is curative in rickets, and which

2. McCollum, E. V.; and Simmonds, Nina: The Newer Knowledge of Nutrition. New York: Macmillan Co., 1929.

3. Funk, Casimir; Caspe, Saul; and Caspe, Helen: A New Pathological Condition of Probable Dietetic Origin in Rats. Proc. Soc. Exper. Biol. and Med., 28:816, May, 1931.

4. Phelps, Winthrop M.: Specificity of Light Action in Tuberculosis. Jour. Bone and Joint Surg., 12:253, April, 1930.

converts certain vegetable and animal fats into vitamin D, the antirachitic vitamin.

Much shorter than the ultraviolet waves, with an unstudied portion of the spectrum in between, comes the grenz ray, recently described as valuable in the treatment of a number of skin lesions. The grenz ray is said to be less irritating than the x-ray.

Shorter and much more penetrating is the x-ray, the foundation of the modern science of diagnosis. The x-ray has exposed the interior of the living body for examination in this century as only autopsy could do in the Nineteenth Century. In addition to its diagnostic worth, the x-ray has been called the most valuable single therapeutic agent in dermatological practice. The gamma ray of radium is of course shorter than the x-ray. A shorter ray, the cosmic ray, has been measured and studied.

With the control of light therapy and accurate delivery of ethereal waves of a particular length through machines which can be sold to physicians at decreasing cost, invisible light will become more widely used for healing and further studies will be made of its clinical effects. In light may be found the magic bullet which Ehrlich wished to train against infection or other disease. The physicists have opened another field of therapeutic adventure, which may eventually relieve any human pain.

### GLANDULAR THERAPY

From students with an entirely different angle of vision, the physiologists, have come the tissue extracts. The physiologists have manufactured no drugs from inorganic raw materials, but have painstakingly separated therapeutically active from inert portions of animal tissues. With the obtaining of physiologically potent substances from the endocrine glands, with the early studies of pituitrin from the posterior lobe of the hypophysis, and suprarenalin from the medulla of the suprarenal glands, with the studies of cretinism and the thyroid and thyroxin, this work began. The isolation of insulin and the successful treatment of diabetes within the past decade gave glandular therapy its great impetus. Since insulin, the rush of laboratory men to the endocrines for potent drugs has been comparable to the gold rushes to California and the Klondike, and as many fine claims have been staked. Isolation of the follicular hormone of the ovary, which induces estrus in animals; of corpus luteum hormone, which permits nutrition of the growing embryo in the uterus; of the anterior pituitary hormones, which permit growth and initiate the activity of the ovarian hormones; of parathormone, which controls calcium metabolism and prevents tetany; and of the last powerful agent of this class to be announced, the suprarenal cortical hormone, effective in control of Addision's disease, has presented the most potent and specific medicinal agents in the history of medicine. These are all substances synthetized within the animal and human organism, with unlimited possibilities for the alleviation of human woe. It is needless to dwell upon their dangers, which are as great. They have tremendous potentialities for healing adult disease. They are the drugs to which present day physicians must look with dawning hope for control of hitherto intractable conditions.

### FUTURE

The work of these four independent and widely separated groups of scientists, the pure chemists, the biochemists, the physicists, and the physiologists, has converged in the past fifteen years to the great fortune of medicine. With chemotherapy, which should produce a chemical to treat any diseased tissue or parasite and prevent or cure all infections; with the vitamins and other elements of nutrition described by the biochemists, which certainly have cured many diseases and which possibly can prevent every disease; with ethereal waves, supernatural and insensible messengers which travel through wood and flesh and bone to stimulate a friendly cell or destroy a hostile one; and with the active gland extracts of the physiologists which should finally supply every basic deficit of an adult body, why should the man of the future ever die? What reason is there that therapy a century hence should fail?

These varied lines of medical advance have one point in common: a dependence for their progress and for their existence upon the use of animals for experimental purposes. Every productive type of medical work would cease upon the withdrawal of animal material for study. Upon observations of animal reactions, conducted with greatest care and consideration for the prevention of animal suffering, rests the whole foundation and edifice of modern medicine.

## GLEANINGS FROM RECENT JOURNALS

ANEMIA.—In Montreal, Mills[1] comments upon early spinal cord changes in pernicious anemia. In some cases these could be demonstrated before any anemia could be shown. One patient with a hemoglobin of 100 per cent complained only of difficulty in controlling his legs when descending the stairs.

There have been many reports, Mills says, of advance of cord changes under treatment with liver extract. Some of his cases have progressed while on liver extracts, but none has progressed on whole liver. Upon examination, he found that several extracts on the market in Canada were ineffective and impotent.

Doubtless inactive extracts have been offered in the United States as well. The medical profession here has been greatly aided in its selection of liver extracts and of other drugs by the examinations of the Council on Pharmacy and Chemistry of the American Medical Association, which has differentiated potent drugs in a huge market of inactive ones.

Forman and Daniels,[2] of the University of Iowa, have studied the heart size of rats with anemia. They found a close correlation between the size of the heart and the degree of anemia. As the hemoglobin fell a little, there was slight hypertrophy. When it had fallen to nearly one-fifth normal, the heart weight was three times that of a normal animal. The close dependence of heart disease upon blood quality, probably oxygen supply, is thus shown.

The relationship of heart irregularities to thyroid disease has long been recognized. Cardiac disease may have its origin in a number of abnormalities, two of them just mentioned, anemia and thyroid disease being to a considerable degree controllable. The treatment of heart disease must be, then, as varied as the etiology, which may be of a hundred types.

Barnett Sure[3] reports that anemia is not dependent upon vitamin A or D deficiency. Cod liver oil is not beneficial in its treatment. Anemia accompanies vitamin G deficiency, which is supposed to give the symptoms which resemble pellagra. Although vitamins are important in blood building, in two vitamin deficiencies one may find a normal blood count.

VITAMIN A ACTIVITY.—Marcus,[4] of the International Vitamin Corporation, of New York City, reports that a number of tablets marketed as containing concentrated vitamin A were ineffective in controlling symptoms of vitamin A deficiency. Vitamin A was apparently destroyed on standing for a fairly short time in contact with finely divided solids. Vitamin A concentrates stored in contact with starch and lactose, substances frequently used in commercial preparations of cod liver oil pills, were inactive. He suspects that vitamin A is destroyed on standing in contact with any finely divided solid.

In view of the wide acceptance of cod liver oil tablets, and of their approval by the Council on Pharmacy and Chemistry of the American Medical Association, it is improbable that these conclusions can be correct. If they should be confirmed, the large number of cod liver oil pills now on the American market would have to be considered a total loss. The implication should not be considered without thorough investigation.

PREGNANCY DIAGNOSIS.—Weisner,[5] of Edinburgh, reports upon the second year's working of a pregnancy diagnosis station. The Ashcheim-Zondek test has been in use there for two years and has given only 2.41 per cent error. It is a test, says Weisner, for a fully functional placenta or its derivatives. A positive reaction will be obtained in cases of incomplete delivery or incomplete abortion when adherent portions of the placenta are obtained. A positive reaction is obtained in hydatidiform mole and in chorion epithelioma. In twenty-two cases of advanced pregnancy a negative test was obtained. In seven of these cases the pregnancy terminated prematurely, indicating perhaps absence of a normally functioning placenta.

The Ashcheim-Zondek test has thus established itself on a par with the Wassermann reaction for syphilis as a laboratory measure of accuracy and physiological importance. The rare cases in which a false positive or negative is reported are of clinical significance and require further study.

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1. Mills, E. S.: Potency of Liver Extract in Treatment of Pernicious Anemia. Canada Med. Ass'n. Jour., 24:628, May, 1931.
2. Forman, M. B.; and Daniels, A. L.: Effect of Nutritional Anemia on the Size of the Heart. Proc. Soc. Exper. Biol. and Med., 28:479, Feb., 1931.
3. Sure, Barnett; Kik; Walker: Hemopoietic Function in Avitaminosis. Proc. Soc. Exper. Biol. and Med., 28:495, Feb., 1931.
4. Marcus, J. K.: Destructive Action of Finely Divided Solids on Vitamin A. Jour. Biol. Chem., 90: 507, June, 1931.
5. Weisner, B. P.: Pregnancy Diagnosis Station: Report on Second Year's Working. Brit. Med. Jour., 3671, p. 860, May 16, 1931.

OVARY AND PITUITARY.—Prolan is a hormone presumably from the anterior pituitary gland, and found in the urine of pregnant women. It is known that the ovarian hormone is inactive in the absence of the anterior pituitary gland, that the pituitary gland does not stimulate sexual development in the absence of the ovary. Prolan,[6] it appears, does not stimulate sexual development in the absence of the pituitary. Prolan is only one of the pituitary secretions and cannot exert the expected effect in the absence of other pituitary hormones. One part of the pituitary does not function fully alone, but several component parts are needed to carry on the physiological cycle.

When a single animal can be kept alive without thyroid, parathyroids, hypophysis, gonads, pancreas and suprarenals, substituting the extracts of each of these, which have been isolated, students will learn still more of the chain of physiological events. This should be the next step in order.

# New Orleans— Where We Meet

## OLD NEW ORLEANS*

Hoary with age but still preserved through more than a century are the buildings and the entire settings in which were enacted the dramas, the romances, and the tragedies of the bygone ages of New Orleans, scene of the twenty-fifth annual meeting of the Southern Medical Association, November 18-20.

Nestling in the heart of New Orleans today is the Vieux Carre, or Old Quarter, extending for six blocks from the Mississippi River and for fourteen blocks from Canal Street, the city's main thoroughfare. The Vieux Carre is the New Orleans of the past, the city laid out by Bienville in 1718.

Just as the Vieux Carre is the heart of old New Orleans, the Place d'Armes is the heart of the Vieux Carre. It was within and around the old tall iron pickets that mark the square of the Place d'Armes that most of the incidents recorded in the history of Old New Orleans took place. It was on this historic spot, in fact, that the Louisiana territory, constituting most of the Mississippi Valley, was transferred three times: from France to Spain, from Spain to France, and from France to the United States.

In connection with this latter transfer in 1803, representatives of the United States were sent to France for the purpose of purchasing New Orleans only. President Jefferson set the highest price at ten million dollars. Napoleon's minister, the clever Talleyrand, however, told the American emissaries: "We will never sell the port of New Orleans alone; all the west is valueless without New Orleans." And the French offered all the territory from the Mississippi to the Rockies for only five million dollars more than Jefferson was willing to pay for New Orleans itself. The sale was made.

The transfer of Louisiana from France to the United States was made in the Cabildo, which overlooks Jackson Square, as the Place d'Armes is now called. The Cabildo, the seat of government for nearly a century, was built in 1795. It was the city hall, the state supreme court building, a magistrate court, a jail and the scene of many critical political contests. It was also the place where the first Protestant services in Louisiana were held and it now houses the interesting and valuable exhibits and library of the Louisiana Historical Museum.

Touching the Cabildo is the St. Louis Cathedral, completed in 1794, on the site of Louisiana's first church. The building was erected by Almonaster y Roxas during the regime of the Spanish governor, Baron de Carondelet. Changes and additions have been made, but the

Place d'Armes, the Heart of the Old Quarter of New Orleans.

Buildings left to right are the Cabildo, St. Louis Cathedral and Presbytery. On the right side is the lower Pontalba Apartment and in the foreground Jackson Square and Monument.

6. Evans, H. M.; Meyer, Karl; and Simpson, M. E.: Relation of Prolan to Anterior Hypophyseal Hormones. Proc. Soc. Exper. Biol. and Med., 28:845, May, 1931.

*By J. J. Rinderle, Editor, Bureau of New Orleans News, New Orleans Association of Commerce.

cathedral stands today practically the same as it has stood for more than a century. Regular church services still are held in the edifice.

Flanking Jackson Square on both sides are the buildings that Baroness Pontalba, daughter of Don Almonaster y Roxas, erected in 1849. In the old days these buildings were sumptuous apartments and still bear in the iron scrollwork of the balconies the monogram of their noble mistress.

Interesting, too, because of the exotic life that still teems through, in and around it and because of its colorful historic associations, is the French Market, built originally in 1791. This market for long has been one of the traditional spots of peculiar interest. The many nationalities, the quaint dress, the varied languages, the stalls with their picturesque array of fruits, vegetables, fish and meat have made it a show place to visitors. There are several crude but popular coffee stands in the market that each night draw hundreds of Orleanians for their "after the show" coffee.

There remain today many additional relics in the Vieux Carre that tell their colorful stories of yesteryear. There is, for example, the Archbishopric, the oldest building in the Mississippi Valley, built in 1727-1734; there is the Beauregard House in which Paul Morphy, the world's greatest chess player, was born. General Beauregard, who directed the Confederate forces at the Battle of Shiloh, later acquired the home. Still later it was the scene of a vendetta battle and until the Eighteenth Amendment was enacted it was occupied by Silesian wine merchants.

Another building full of historic memories is the Cafe des Refuges, the rendezvous of pirates and buccaneers in days of old. Here it was that "Le Petit Couve," the famous cordial, was concocted for the first time. The Old Absinthe House, built in 1752, is another relic that was extremely popular in the days before prohibition. It was in this building that many of the famous old drinks of days that are no more were originally made. The construction of the Old Absinthe House, like that of many others, is distinctly European and unlike anything seen elsewhere in America.

There are numerous other vestiges of the old city that remain to this day. Prominent among these is the Napoleon House, said to have been built as a refuge for Napoleon after his expected escape from St. Helena; the Orleans Theater, scene of the first opera performance in America and of the famous quadroon balls; the Haunted House, on which George Washington Cable ranged at large in his novels; and the Beauregard Square, where the weird and repulsive rites of the Voodoo Queens were enacted.

It is just this mingling of the old and the new that has given New Orleans the distinction of being a city with a dual personality, a city of two worlds. While New Orleans has taken very definite steps to preserve these relics of the past, it has not failed to keep in step with modern progress. Through all of the romances and tragedies of the past, New Orleans has grown to be the South's Greatest City and America's second greatest port.

# Book Reviews

*General Medicine.* The Practical Medicine Series. Edited by George H. Weaver, M.D., Lawrason Brown, M.D., George R. Minot, M.D., S.D., William B. Castle, M.D., William D. Stroud, M.D., and Ralph C. Brown, M.D. 848 pages with illustrations. Chicago: The Year Book Publishers, 1930. Cloth, $3.00.

Medicine has been enriched by research on psittacosis, undulant fever and tularemia during the past year. Smallpox seems to be more common than usual, as many more cases are being reported. A contribution on arthritis is of particular interest, prepared by Ralph Pemberton as committee chairman.

In the section on diseases of the lungs, surgery in tuberculosis has received a great deal of emphasis. Dr. Hurst (an asthma sufferer himself) submits a very interesting paper on this condition.

The part on blood and blood dyscrasias contains a large amount of experimental work, especially in regard to the erythrocytes and the different staining methods. Pernicious anemia and its relation to sprue as well as the neurological aspects are still under debate. A large amount of new information has been added to this question. An excellent critique of nephrosis is offered.

Diseases of the heart and blood vessels are discussed under the headings of the American Heart Association's table of nomenclature. This criterion for nomenclature marks an important advance in complete diagnosis and should tend to a better understanding of the pathology involved and the treatment of the patient.

The medical and surgical treatment of ulcer both have proponents. The papers this year point to closer cooperation between internist and surgeon, the patient being subjected to surgery only in emergency or after medical care has failed.

The field of medicine has been well covered by the editor. A volume of this type is essential in its field.

*The Practical Medicine Series: Nervous and Mental Diseases.* By Peter Bassoe, M.D., Clinical Professor of Neurology, Rush Medical College of the University of Chicago. 451 pages with illustrations. Chicago: The Year Book Publishers, 1931. Cloth, $2.25.

Nervous disorders during the past year have been the subjects of some very exhaustive research. Perhaps the most outstanding contribution is the isolation of an active cortex extract by Swingle and Pfiffner and Hartman, Brownell and Hartman, under the name cortin, each group independently. No doubt this extract will be found useful in other conditions besides Addison's disease. A warning against pelvic radiation is embodied in several reports from the Gynecean Hospital. Encephalitis still follows the trend that was observed last year. There has been an increase in all forms of the disseminated types, but no epidemics. Of interest to the surgeon is the use of nerve blocks to estimate preoperatively the effect of resection on the circulation. Vaccines in the treatment of disseminated sclerosis have been in use since 1927 and now over 200 cases are offered in the series. Spherula insularis is given as the causative factor. The literature is well up to standard and indicates progress in this field.

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*The Treatment of Asthma.* By A. H. Douthwaite, M.D., F.R.C.P. (Lond.), Assistant Physician, Guy's Hospital. 164 pages. New York: William Wood & Co., 1931. Cloth, $2.50.

The writer's idea in presenting this book was evidently to advocate the more extensive use of physical therapy in the treatment of asthma. His ideas vary widely from those held by most American workers in this field.

Judging from their writings and clinical practices, most American immunologists consider the various methods of specific protein therapy helpful, and physical therapy as of little if any value.

This author, on the other hand, says that both specific and non-specific therapy, which he classes together, are of little value and that physical therapy is possibly of great help.

The book gives a short and very sketchy resume of the whole subject, which is much too incomplete to be of any value. Even the descriptions of the physical therapeutic procedures are too incomplete to be of any help should one be inclined to try them.

The author attempts to cover too much territory in too short a space and as a consequence fails to do a completed job in any part.

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*The Theory of Obstetrics.* A Functional Study of Child-Bearing Based on a New Definition of Normal Labor and on a New Theory of Uterine Inertia, and Illustrated by a Detailed Statistical Analysis of 100 Consecutive Labors, and Some Records of Cases of Painless Labor. By M. C. DeGaris, M.D., Author of "Clinical Notes and Deductions of a Peripatetic." 272 pages. New York: William Wood & Co., 1931. Cloth, $5.00.

DeGaris expounds the theory that "A normal labor is one in which the uterine contractions act thoroughly efficiently, leading in a short time to the spontaneous delivery of a healthy baby, and causing little or no distress or suffering to the mother." Further, in his discussion, he gives the impression that labor should be painless and cites a number of cases in support. Except for this his theory is not different than that held by other clinicians, for painless labor has been the goal of their efforts.

Among the factors tending to a hard labor are described abdominal reflexes, occiput posterior, certain mechanical difficulties, vaginismus, and uterine inertia, though the most stressed are diet and hidden dental sepsis, with the latter receiving great emphasis.

The second portion of the book contains a number of tables which are drawn from an analysis of 100 consecutive cases delivered by the author. Following these are short chapters on puerperal fever, albuminuria, pyelitis and eclampsia, congenital debilities, research, treatment and prenatal care.

Certainly the ideas of the writer call for consideration of this problem. But to consider dental sepsis and the filling of teeth as more than casual factors returns memories of former searches for foci of infection. And as the author states, "the number of cases is too small to prove, only to offer."

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*Practical Anesthetics.* For the Student and General Practitioner. By Charles F. Hadfield, M.B.E., M.A., M.D., Camb.; Sen. Hon. Anesthetist, Prince of Wales Hospital. Second Edition. 336 pages with illustrations. New York: William Wood & Co., 1931. Cloth, $3.50.

In the second edition of a very simply written book, the student is not burdened with a great mass of verbosity and unimportant details. The print is large and clear. The commoner agents, such as ether, chloroform and ethyl chloride, are given full consideration. Stress is not laid on the more expensive apparatus, although due to its wide use the gas-oxygen-ether machine is described. Ethylene and avertin are included in this edition. Regional anesthesia, percaine and spinal, have been alloted more space. The decision of the author to omit discussion of the barbituric compounds is regrettable. It is a safe book for the beginner.

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*Medical Administration of Teaching Hospitals.* By Emmet B. Bay, M.D. 136 pages. Chicago: The University of Chicago Press, 1931. Cloth, $2.00.

This volume is a comparative study of medical administration in nineteen teaching hospitals. Neither the West nor far South is represented in the tabulations. Such problems as admission, records, full- and part-time staff, residents and interns, bed assignments, out-patient departments, status of deans and superintendents come up for discussion. As each is considered the solution of the different hospitals is given.

In addition, various other theoretical solutions are set forth. They are based upon observation and the opinions expressed by the various members of the several institutions, from admitting clerk to dean. The appendices give the method of tabulation and a brief descriptive summary of the institutions.

If the author were to make a more complete survey he would find several of his theoretical solutions in practice. However, an excellent cross section of a very live problem has been presented in this volume.

*Clinical Diagnosis by Laboratory Methods.* By James Campbell Todd, Ph.B., M.D., Late Professor of Clinical Pathology, University of Colorado School of Medicine; and Arthur Hawley Sanford, A.M., M.D., Professor of Clinical Pathology, University of Minnesota (The Mayo Foundation); Head of Section on Clinical Laboratories, Mayo Clinic. Seventh Edition, thoroughly revised. 765 pages with 347 illustrations, 29 in colors. Philadelphia: W. B. Saunders Company, 1931. Cloth, $6.00.

Clinical pathology has become an important specialty, and this text, now in its seventh edition, has kept pace with its development. A few obsolete methods have been omitted, but many new additions have been made. Among them are Cooper and Uyei's method of culture of *B. tuberculosis*, Fairhall's method for the determination of lead, Folin's 1929 method for the precipitation of blood and body fluid protein, Clark and Collip's method of calcium determination, the Gregersen test for occult blood, a modification of the Ashcheim-Zondek test for pregnancy as well as many others.

Dr. Sanford has retained the same method of presentation as in previous editions. The text will without doubt retain its popularity and serve as a standard in its field. It is a book which the practitioner can ill afford to be without.

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*Text Book of Physical Therapy*: By William Benham Snow, M.D., Author of "A Manual of Electro-Static Modes of Application, Therapeutics, Radiography and Radiotherapy" and other works. 708 pages with illustrations. New York: Scientific Authors' Publishing Company, 1931. Cloth, $10.00.

The first part of this volume deals with constant and static currents; the second discusses high frequency and the third is devoted to electrosurgery. As each modality is given the history, actions and physiology and finally therapeutic properties are discussed. The methods, indications and dosage are more specific than those usually found. Not only are the indications covered, but also the limitations for each current. The work is based on clinical experience and research on the part of the author and others. Many case histories are cited.

This ponderous volume covers the field, in fact one feels too completely, in that the use of the machine has not been restricted enough. A specific instance is diathermy in gonorrheal urethritis. Urologists have proven that it is of no value in this field. It is a book to follow, but one should be guided by it only as long as results are achieved.

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*Health on the Farm and in the Village.* By C.-E. A. Winslow, Dr.P.H., Professor of Public Health, Yale School of Medicine. 281 pages with tables, charts and illustrations. New York: The Macmillan Company, 1931. Cloth, $1.00.

Cattaraugus County, New York, is the rural community selected for aid by the Milbank Memorial Fund. For the past several years it has had for expenditure a per capita sum equal to that of a city health department, the largest per capita fund yet made available for rural service. It was granted to determine the effect of intensive application of known health measures in a rural community. Tuberculosis control, laboratory service, and public health nursing service are phases upon which it has concentrated. In other necessary public health activities Winslow believes it has been deficient, for example: in venereal disease control, in infant and school hygiene, and sanitation. These are to be strengthened and further worked out in the future.

This account of the work and accomplishments is pleasingly written by a well known authority on health administration. Every public health worker should acquaint himself with these studies.

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*The Criminal, the Judge, and the Public.* By Franz Alexander, M.D., Visiting Professor of Psychoanalysis at the University of Chicago, and Hugo Staub, Attorney at Law, Berlin. Translated from the German by Gregory Zilboorg, M.D., Bloomingdale Hospital, White Plains, N. Y. 238 pages. New York: The Macmillan Company, 1931. Cloth, $2.50.

Alexander and Staub attempt to apply psychoanalysis to the criminal. The text is divided into two parts: the first regards the crime and makes a study of the criminal personality in relation to the crime. Under this part are discussed the neurotic criminal, perversion and criminality, and it closes with a psychoanalytical table of criminal diagnoses.

The second part consists of criminal cases which have been studied by these methods. The book is written for both layman and physician and gives a sound appraisal of this type of examination.

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*Chemistry for Nurses.* By Harry C. Biddle, A.M., Instructor in Chemistry, School of Nursing, Western Reserve University. 336 pages with tables and 74 illustrations. Philadelphia: F. A. Davis Company, 1931. Cloth, $2.75.

Well bound and printed, this text is designed to cover the chemistry course in forty-five hours. The author presents the essential facts and principles, giving at the head of each chapter an outline. A few questions followed by the discussion at the end of the chapter are exercises to be performed by the student. Nicely planned and illustrated, it should stimulate the interest of the pupil.

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*Practical Methods in Venereal Diseases.* By David Lees, D.S.O., M.A., M.B., D.P.H., F.R.C.S., M.R.C.P. (E), Surgeon in Charge of Venereal Diseases, The Royal Infirmary, Edinburgh, with Introduction by Wm. Robertson, M.D., F.R.C.P., D.P.H., Late Medical Officer of Health, Edinburgh. Second Edition. 634 pages with illustrations, some in colors. New York: William Wood & Co., 1931. Cloth, $5.00.

In conformity with newer methods various changes have been made in the text. Staining methods of spirochetes have been revised and flocculation tests for diagnosis have been included. A chapter on cardiovascular syphilis has been added. Reference is made to the effect of tryparsamide, malaria and pyrotherapy on neurolues. A few additions have been made to the section on gonorrhea.

The methods are those in use in England, the text not changing from the fundamentals of the previous edition. Proprietary medicines, most of which are little known in this country, are recommended in treating these conditions.

*The Practical Medicine Series.* Obstetrics, by Joseph B. DeLee, A.M., M.D., Professor of Obstetrics, University of Chicago Medical School, and J. P. Greenhill, B.S., M.D., F.A.C.S., Attending Obstetrician, Chicago Lying-in Hospital and Dispensary. Gynecology, by John Osborn Polak, M.D., Professor of Gynecology, Long Island College Hospital, Brooklyn, N. Y. 640 pages with illustrations. New York: The Year Book Publishers, 1930. Cloth, $2.50.

A review of the literature during the past year points to a reasonable amount of progress in the field of obstetrics. The results achieved by L. Willhard in sterility by means of tubal insufflation are indicative of its effectiveness. In 406 cases, 21 per cent of the primary and 30 per cent of the secondary cases responded. Further work on the Ashcheim-Zondek test confirm its accuracy in the diagnosis of early and doubtful cases. Thymophysin seems to have followed pituitrin as an aid in early labor. An important plea contained in these pages is that the baby is also a live human being and should be handled with consideration.

The tendency in gynecology is to conservation. F. A. Pemberton reviews the progress of the specialty for the past year. A very lucid account of office procedures is given by W. T. Dammeuther. And C. T. Miller writes on minor pathology of the vulva. Besides the above, many other interesting and profitable papers are included.

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*Hemorrhoids. The Injection Treatment and Pruritus Ani.* By Lawrence Goldbacher, M.D. 206 pages illustrated with 31 half-tone and line engravings, some in colors. Second Revised Edition. Philadelphia: F. A. Davis Company, 1931. Cloth, $3.50.

Goldbacher excludes external hemorrhoids from the injection method. Using large amounts of phenolized cotton seed oil (5 per cent) he treats internal hemorrhoids and pruritus ani. At this time he advocates the using of larger amounts of this agent than previously, one patient receiving 53 c. c. in six weekly doses. In pruritus this method is used only after other means have failed. A clear account is given of the anatomy, technic and instruments used. No mention is made of the effect of such large doses of phenol on the body and particularly the urinary system.

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*A Manual of Tuberculosis for Nurses.* By E. Ashworth Underwood, M.A., B.Sc., M.B., Ch.B., D.P.H. (U. Glas.); Deputy Medical Officer of Health and Tuberculosis Officer, County Borough of Rotherham. With an introduction by Professor J. R. Currie, M.A., M.D., M.R.C.P., D.P.H., Professor of Public Health in the University of Glasgow. 272 pages with illustrations. New York: William Wood & Co., 1931. Cloth, $2.50.

A manual which provides more specialized information upon tuberculosis for the nurse who wishes to make care of these patients a life work. The first chapter deals at length with a description of the bacillus, points of attack and dissemination and reaction of the body to the disease. Other chapters explain the care of the patient in the sanatorium, private homes and the dispensary. Preparation of the room, the food and the duties of the nurse are given. Tuberculosis of childhood, bones and joints and light therapy receive special attention. The text takes particular pains to bound the limits of the nurse's activities, but at the same time offers sufficient information to stimulate the nurse engaged in this specialty.

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*The Practical Medicine Series: Dermatology and Urology.* By William Allen Pusey, Francis Eugene Senear, and John H. Cunningham. Dermatology and Syphilis by William Allen Pusey, A.M., M.D., Emeritus Professor of Dermatology, College of Medicine, University of Illinois, and Francis Eugene Senear, B.S., M.D., Professor and Head of the Department of Dermatology and Syphilology, College of Medicine, University of Illinois. Urology by John H. Cunningham, M.D., Associate in Genito-Urinary Surgery, Harvard University Post-Graduate School of Medicine. 474 pages with illustrations. Chicago: The Year Book Publishers, 1931. Cloth, $2.25.

The literature on dermatology during the past year indicates serious thought and work, but no spectacular successes. A warning has been issued against the use of thallium acetate, fourteen children having died after administration.

In urology the articles are on par with those of previous years. Uroselectan has definitely become a useful diagnostic agent. Of particular interest is a symposium on urinary antiseptics, reported at the International Urologic Society. Many controversial facts have been uncovered about kidney disease and function from experimental studies and clinical laboratories. The field is well covered in the selection which is offered.

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*Manual of Surgery.* By Alexander Miles, M.D., LL.D., F.R.C.S. (Ed.), Consulting Surgeon, Royal Infirmary, Edinburgh, and D. P. D. Wilkie, M.D., F.R.C.S. (Ed. and Eng.), Professor of Surgery, University of Edinburgh. 574 pages with illustrations. Eighth Edition, Vol. 1. New York: The Oxford University Press, 1931. Cloth, $3.80.

This volume is concerned with general surgery. It does not differ from previous editions, except that the information has been brought up to date. Such conditions as repair, inflammation, suppuration, ulceration, gangrene, tumors, blood vessels, muscles, bursae and bones and joints are dealt with according to the simplest surgical methods. The text is a reflection of the Edinburgh school of medicine.

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*Text Book of Human Embryology.* By Cleveland Sylvester Simkins, Ph.D., Associate Professor of Anatomy, University of Tennessee Medical School, Memphis, Tennessee. 469 pages with 263 illustrations, some in colors. Philadelphia: F. A. Davis Company, 1931. Cloth, $4.50.

The author has restricted his descriptions entirely to man, though at times references are made to other mammals. Throughout the text the physiology of the different phenomena and the functional aspects of development are emphasized. The large number and the clearness of the illustrations should enable the student to grasp the subject.

*A Handbook for Senior Nurses and Midwives.* By J. K. Watson, M.D. (Edin.), Captain, R.A.M.C.; Late House Surgeon, Essex and Colchester Hospital, and Assistant House Surgeon, Sheffield Royal Infirmary and Sheffield Royal Hospital. Second Edition. 676 pages with illustrations. New York: The Oxford University Press, 1931. Cloth, $4.00.

The author offers this text to be used in conjunction with a companion volume, "Handbook for Nurses." He selects certain topics, giving them a more detailed treatment than is found in his more elementary book. This is the second edition. Revisions and additions have been made to all chapters, treatment following the accepted English practice. There is too great a tendency to describe operative procedure in minute detail.

The section on obstetrics has been enlarged. Under the chapter on maternal mortality he states: "It comes to this, then, that on the whole those who are best fitted to look after a woman during pregnancy are either the well-trained midwife or the obstetric specialist * * * and they are not tempted * * * to shorten labor to the detriment of the patient." The midwife's training is admittedly not on par with the practitioner's, and moreover it is the specialist who is known for making the version and episiotomy requisites to labor. Lacking in completeness, this text can hardly be recommended.

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*General Therapeutics.* By Bernard Fantus, M.S., M.D., Associate Clinical Professor of Medicine (Therapeutics), Rush Medical College of the University of Chicago; Member, Revision Committee, United States Pharmacopoeia and of National Formulary Revision Committee. In Collaboration with Louis B. Kartoon, B.S., M.D., Instructor of Medicine, University of Illinois College of Medicine. 456 pages with illustrations. Chicago: The Year Book Publishers, 1931. Cloth, $2.25.

Abstracts of the literature during the past year show a great many advances in therapeutics. Among the more outstanding is the use of copper in anemia. Several papers have been included in this book. With the advent of any new drug there comes a period of enthusiasm followed by one of rationalization. This is becoming apparent in the use of viosterol as contrasted with cod liver oil. With the great amount of work that is being done on rickets as brought out in this volume it should soon be classed as a rare condition.

Among physical agents the use of diathermy in pyretotherapy and the use of iopax (uroselectan) in roentgen pyelography are worthy of note.

Anesthesia has been further enriched by the use of intravenous barbiturates and avertin. A full discussion of these is given in an article, "Progress in Anesthesia."

Citric acid as a milk modifier, hexylresorcinol (ST 37) as an ascaridicide, xylene in pediculosis, strammonium in conjunction with hyoscine in Parkinson's disease and quinine and urethane in the obliteration of hydroceles are among the new uses for old drugs.

*Fundamentals of Dermatology.* By Alfred Schalek, M.D., Professor of Dermatology and Syphilology, University of Nebraska College of Medicine. 247 pages with illustrations. Philadelphia: Lea & Febiger, 1931. Cloth, $2.00.

This is a small book with many good illustrations. The methods of therapy mentioned are necessarily few, but are on the whole well chosen. The English is frequently poor.

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# Southern Medical News

## ALABAMA

Dr. E. Uribe, of the Medical Department of the Republic of Mexico, Mexico City, spent some time in July in Birmingham observing the County and City health work.

Dr. Leland W. Chapman has moved from Tuscumbia to Jackson, his boyhood home, where he will practice, and where his father, Dr. G. S. Chapman, has practiced for many years.

### Deaths

Dr. William Preston Hicks, Birmingham, aged 42, died April 30.

Dr. Abner Farned, Russellville, aged 67, died May 17.

Dr. Thomas Edmund Dryer, Huntsville, aged 71, died May 27.

Dr. Charles Elias Williams, East Tallassee, aged 52, died May 3 of heart disease.

## ARKANSAS

A joint all-day session of the Clinical Staff Societies of St. Edward's, St. John's and Sparks Memorial Hospitals, Fort Smith, was held recently with an attendance of approximately one hundred physicians. There were twenty-three speakers on the program.

The First Councilor District and Northeast Arkansas Medical Society had as its guest speaker at their meeting at Paragould Dr. John L. Jelks and Dr. Thomas D. Moore, of Memphis.

The Howard-Pike Counties Medical Society have elected Dr. W. M. Gibson, Nashville, President, and Dr. J. T. Holcombe, Mineral Springs, Secretary.

### Deaths

Dr. John L. Butler, Sheridan, aged 66, died June 13.

## DISTRICT OF COLUMBIA

Dr. William Gerry Morgan, Washington, immediate Past President of the American Medical Association and a member of the Council of the Southern Medical Association, has been honored by being made a Member of the Board of Regents of Georgetown University, Washington. Dr. Morgan has been Professor of Gasto-Enterology in the School of Medicine, Georgetown, for some years.

Dr. William J. Mallory, Washington, was elected first Vice-President of the American Therapeutic Society at its recent meeting in Atlantic City; and Dr. Grafton Tyler Brown, Washington, was elected Treasurer.

Dr. Clinton Hart Merriam has been announced as one of the three to receive the Roosevelt Medal for Distinguished Service for 1931, which is given annually by the Roosevelt Memorial Association. Dr. Merriam was Founder and Director for twenty-five years of the United States Biological Survey.

Dr. Earl Baldwin McKinley has been appointed Dean of George Washington University School of Medicine to succeed Dr. William Cline Borden, retired. Dr. McKinley formerly was Professor of Bacteriology in

Continued on page 32

*Council* *Exempt*

# DEXTROSE & SODIUM CHLORIDE (Searle)

## An Acceptable Solution for Obliterating Varicose Veins

deTakats[1], Zimmerman[2], McPheeters[3], Kern[4], in recent publications discussing the indications and contraindications for the obliterative treatment of varicose veins are in accord on one point. The consensus of opinion being that, for deep vein work, a solution of 50% Dextrose and 30% Sodium Chloride, equal parts, is an acceptable solution for treating varicosities of this character.

Technic may vary but for routine injections Dextrose and Sodium Chloride (**Searle**) has been found satisfactory in the majority of cases. The addition of Benzyl Alcohol provides sufficient anesthetic to reduce post-injection cramping to a minimum. This feature appeals to many clinicians who prefer this particlar solution to all others.

Dextrose and Sodium Chloride(**Searle**) is furnished in 20 cc. ampuls with a serum-type rubber stopper so that any part of the contents may be removed without contaminating the remaining portion.

1. deTakats, Geza: "Causes of Failure in the Treatment of Varicose Veins," J.A.M.A. 92:1111 (April 4th) 1931.
2. Zimmerman, L. M.: "Complications and Treatment of Varicose Veins," Ill. Med. Journal, 59:60 (Jan.) 1931.
3. McPheeters, H. O.: "Causes of Failure in the Treatment of Varicose Veins," J.A.M.A., 96:1114 (Apr. 4th) 1931.
4. Kern, H. M.: "Solution of Dextrose & Sodium Chloride for Obliterating Varicose Veins," Annals of Surgery, 93:697 (Mar.) 1931.

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PHARMACEUTICAL MANUFACTURERS
CHICAGO

Continued from page 740

the Columbia University College of Physicians and Surgeons and Director of the School of Tropical Medicine of the University of Porto Rico.

**Deaths**

Dr. Albert Smith, Washington, aged 47, died June 6 of coronary thrombosis.

## FLORIDA

Dr. Thomas W. Hutson, Miami, is the newly elected President of the State Board of Medical Examiners; Dr. Carl A. Williams, St. Petersburg, was elected Vice-President; and Dr. William M. Rowlett, Tampa, was reelected Secretary.

A new law, known as the State Enabling Act, was recently passed in the State, which will make possible the definite protection of citizens in connection with county health units work.

A Florida Council of Health, Welfare and Education was recently held at the call of Governor Doyle E. Carlton and President John J. Tigert of the University of Florida. The following Jacksonville physicians took part in the program. Dr. T. Z. Cason, Dr. F. A. Brink, Dr. Paul Eaton, Dr. Henry Hanson, Dr. S. R. Norris, and Dr. Stewart Thompson.

Fifty dollars has been appropriated by the staff of the Orange General Hospital, Orlando, to be used for prizes for the three best equipped nurses graduating from the training school this year.

Dr. George M. Dawson, West Palm Beach, and Miss Cora Babcock were married at Coconut Grove, Miami, March 3.

Dr. George B. Glover, Monticello, and Mrs. Myra A. Taylor were married in February.

Dr. Frank Schubert and Miss Florence O. Fitterer, both of Miami Beach, were married recently.

Mead's Powdered Lactic Acid Milk No. 1 (containing Dextri-Maltose) may be boiled for ten minutes without curdling. While boiling is unnecessary, as the product is practically sterile, it is a feature which removes a hindrance to the physician's technique confronting him in the use of the old type of powdered lactic acid milk which cannot be boiled without curdling. This product never curdles; it is always ready, and quickly reliquefied. No ice is necessary to keep the powder. It is convenient while traveling. Samples and literature sent on request. Mead Johnson and Company, Evansville, Indiana, U.S.A.

## GEORGIA

Dr. W. W. Anderson, Dr. Roy R. Kracke, and Dr. Jack C. Norris represented Emory University with a Scientific Exhibit at the A. M. A. meeting at Philadelphia in June.

Dr. F. K. Boland, Atlanta, was Vice-Chairman of the Section on Surgery, and Dr. W. A. Mulherin, Augusta, was a member of the Executive Committee of the Section on Diseases of Children at the A. M. A. meeting in Philadelphia in June.

The State Board of Health, the University of Georgia, and Emory University, recently sponsored a free course of study for physicians.

The Chattahoochee Valley Medical and Surgical Association held its thirty-first annual meeting in Albany in July.

Dr. Bennett G. Owens, Valdosta, is the newly appointed Medical Examiner for aviation license applicants by the Aeronautics Branch of the United States Department of Commerce.

Dr. William Lorenzo Moss, Athens, is the newly appointed Dean of the University of Georgia Medical Department, succeeding Dr. William H. Goodrich, Augusta.

**Deaths**

Dr. Elmore Callaway Thrash, Atlanta, aged 63, died June 22 of heart trouble.

Dr. Wanzie Ward Edwards, Butler, aged 53, died April 27.

Dr. Ambrose W. Martin, Carnesville, aged 68, died May 11 of pneumonia.

Dr. Walter Weyman Benton, Winder, aged 29, died May 16 of pulmonary tuberculosis.

Dr. Charles James Clark, Chauncey, aged 74, died June 16.

Dr. M. B. McAfee, Lester, aged 81, died May 30.

Dr. William S. White, Fort Valley, aged 51, died June 12.

## KENTUCKY

Dr. Jefferson L. Atkinson, Campbellsville, has retired from practice after forty-four years of medical service.

Greenup County is to have a Full Time Health Unit with Dr. Miriam R. Marting, Indianapolis, as the Director.

Dr. Harold W. Sterling, Richmond, has accepted a position in the U. S. Public Health Service.

Dr. Lewis C. Coleman, Salyersville, has been appointed Health Officer of Madison County.

Dr. Squire R. Boggess, Lawrenceburg, has been appointed Health Officer of Anderson County.

Full time health units are being established in sev-

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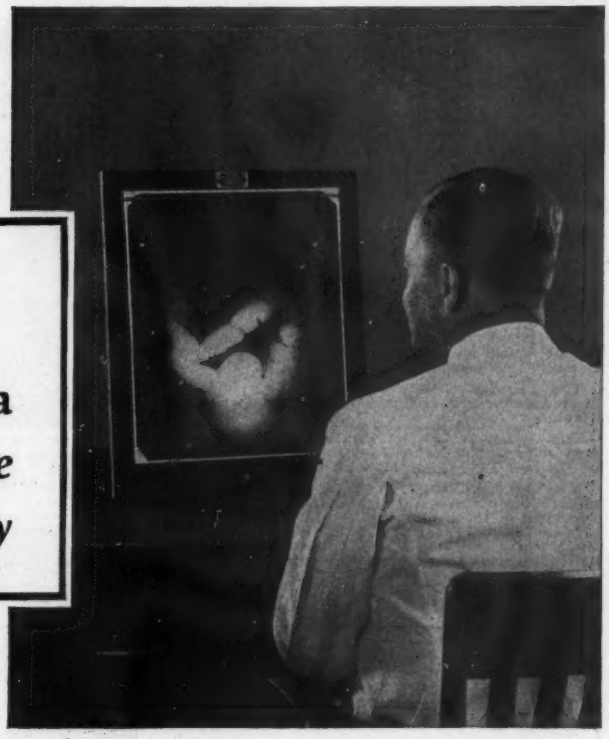
# Faster Films and new Contrast Media *widen the scope of radiography*



NEW fields of usefulness for radiography in general practice are being opened by the use of faster x-ray films and the successful visualization of the gall-bladder, kidneys, ureters, and gastro-intestinal tract through the application of radiopaque substances.

Internal lesions, malformations, and disorders in parts that previously could not be successfully radiographed can now be revealed and studied. More than ever before, x-rays have become a decisive element in positive diagnoses.

In the periodic physical examination as well as in such cases as appear difficult or doubtful, x-rays should be employed. The radiologist can clearly reveal situations impossible to determine in any other way.

Eastman *Ultra-Speed* and *Diaphax* are x-ray films that widen the scope of radiography. Their extreme sensitivity permits the adjustment of exposure factors to record the desired detail and definition when modern contrast media are used for visualization of the part.

**"Devils, Drugs, and Doctors"**

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347 State Street, Rochester, N. Y.

Gentlemen:

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Number and Street ----------

City and State ----------

Continued from page 32

eral counties with the financial aid of the Federal and State Governments. Each unit will have a physician, inspector and two nurses.

Dr. Henry Gray Barbour has resigned as head of the Department of Physiology and Pharmacology at the University of Louisville School of Medicine, it is reported, to accept an appointment on the faculty of Yale Medical School.

The Pineville Hospital and the Stacy-Chappell Hospital, Pineville, have merged, and the new institution is known as the Pineville Community Hospital.

The Southwestern Kentucky Medical Association recently elected the following officers: Dr. David L. Jones, Fulton, President; Dr. Orion Leon Higdon, Paducah, and Dr. Edwin A. Stevens, Mayfield, Vice-Presidents; Dr. James T. Reddick, Paducah, Treasurer for life; and Dr. Thomas J. Marshall, Paducah, Secretary.

The Campbell-Kenton County Medical Society had as the guest speaker at their meeting in June Dr. Russell N. Speckman, Cincinnati.

The Bourbon County Medical Society had as the guest speaker at a recent meeing Dr. Clement C. Fihe, Cincinnati.

The Jefferson County Medical Auxiliary recently gave a Jane Todd Crawford Silver Tea at the home of Dr. and Mrs. G. A. Hendon at Argyle.

Miss Agnes O'Roke, Superintendent of Kosair Crippled Children's Hospital at Louisville, has been elected President of the Kentucky Hospital Association. Other officers elected are: Dr. J. Ernest Fox, Lakeland, First Vice-President; Lake Johnson, Lexington, Second Vice-President; Madge Hamnette, Louisville, Executive Secretary; Dr. John Wathen and Alice Gaggs, both of Louisville, Trustees.

Dr. Will R. Pryor, Louisville, has moved his office to the Heyburn Building for the practice of eye, ear, nose and throat.

### Deaths

Dr. Roland Lee Martin, Providence, aged 57, died May 21 of heart disease.

Dr. James F. Young, Monticello, aged 71, died May 11 of uremia.

Dr. Charles Morehead Smith, Dixon, aged 31, died June 4 of pneumonia.

Dr. Henry Bewlay, Lexington, aged 78, died June 8 of streptococcic infection.

## LOUISIANA

A joint meeting was held recently of the Fifth District Medical Society of Louisiana and the Issaquena-Sharkey-Warren Counties Medical Society of Mississippi.

The Eighth District Medical Society was reorganized recently at a meeting in Alexandria, and the following officers were elected: Dr. William G. Allen, Converse, President; and Dr. Jacob H. Landrum, Alexandria, Secretary-Treasurer.

Dr. Henry Daspit, New Orleans, Dean of the Tulane Graduate School of Medicine, attended the Pan-American Medical Association meeting in Mexico City in July.

Dr. Aristides Agramonte, Professor of Tropical Medicine in the Louisiana State University Medical School, New Orleans, attended the Pan-American Medical Association meeting in Mexico City in July.

The American Medical Library Association were guests recently of the Assistant Librarian of the Or-

Continued on page 36


# DUKE HOSPITAL

*Durham, N. C.*

**WARD PATIENTS.** Duke University cannot give charity treatment to all who apply, therefore patients whose incomes are less than $15 per week should apply for examinations or for admission to the hospital wards (whether full pay, part pay or free), through their family physicians, to the Duke Public Dispensary (Tel. Durham F-131) on the days and hours listed below. The charge for examinations in the Duke Public Dispensary is $2, exclusive of X-rays and special tests, and the ward rate is $3 per day, if the patient can pay. Welfare departments and churches should assist in the payment for the needy.

**SCHEDULE OF THE DUKE PUBLIC DISPENSARY.** White patients at 1 p. m.; colored at 3 p. m. **Medicine and General Surgery:** Daily, except Saturdays, Sundays and holidays. **Obstetrics, Women's Diseases and Urology:** Tuesdays and Fridays. **Children's Diseases, Ear, Nose, Throat and Dentistry:** Mondays and Thursdays. **Eye:** Thursdays. **Asthma, Hay Fever and Skin Diseases:** Tuesdays. **Syphilology:** Wednesdays. **Orthopedics:** Mondays and Wednesdays.

**PRIVATE PATIENTS.** Patients who can pay the private rates of $5 to $8 per day may at any time, through their family physicians in consultation with any member of the hospital staff, reserve private rooms by telephoning to the admitting office (Durham F-131). Appointments for private examinations and treatment may be made in advance by telephoning to members of the hospital staff.

Every effort is being made to cooperate with the medical profession, and patients are asked to return to the physicians who referred them to the hospital and public dispensary.

This announcement of the methods of admission is made to avoid misunderstanding, delay or unnecessary trips.



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| Cystoscopy | Bronchoscopy |
| Orthopedics | Regional and |
| Thoracic Surgery | Local |
| Esophagoscopy | Anaesthesia |

For descriptive literature, terms, etc. address the Director

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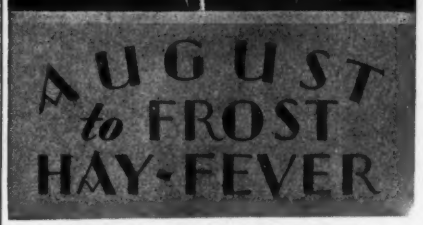
# AUGUST TO FROST

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Continued from page 34

leans Parish Medical Society at a tea at the Petit Salon.

Dr. Oscar W. Bethea, New Orleans, was elected a Vice-President of the American Therapeutic Society at its meeting in Atlantic City recently.

Elizabeth Wisner, Assistant Professor of Sociology, Tulane, is the newly elected President of the American Association of Hospital Social Workers at its meeting in Minneapolis.

**Deaths**

Dr. Benjamin Alfred Ledbetter, New Orleans, aged 62, died May 15.

Dr. Baxter L. Thompson, Jena, aged 68, died May 1 of heart disease.

Dr. Robert G. Hawkins, Palmetto, St. Landry Parish, aged 68, died June 17.

Dr. Samuel M. Lyons, Sulphur, died June 19 as the result of a stroke.

## MARYLAND

Dr. Hugh H. Young, Director of the Brady Institute of Urology, Johns Hopkins University, has had the degree of Doctor of Science bestowed upon him by Queen's College, Belfast, Ireland.

Dr. Ferdinand O. W. Reinhard, Baltimore, has been appointed to succeed Dr. Daniel S. Hatfield, retired, as Director of the Bureau of Communicable Diseases in the Department of Health of Baltimore.

Dr. Samuel J. Price, Church Hill, is the newly appointed Health Officer of Queen Anne's County.

A memorial to the late Dr. Henry Mills Hurd, many years Superintendent of Johns Hopkins Hospital, in the form of an auditorium, is being constructed on the hospital grounds.

Dr. William Henry Welch, Baltimore, received the Barben plaque from the British Royal Institute of Public Health, the highest honor that can be awarded by the Institute.

At the Thirty-Second Annual Meeting of the American Therapeutic Society in Atlantic City, Dr. Harvey G. Beck, Baltimore, was elected President.

Dr. Thomas B. Futcher, Baltimore, is the newly elected President of the Association of American Physicians.

Dr. Edward N. Brush, Baltimore, has resigned as Editor of the American Journal of Psychiatry, his resignation being tendered at the annual meeting of the Association in Toronto. Dr. Clarence B. Farrar, formerly of Baltimore, was chosen to succeed him.

Dr. Henry Laurence Fahrney, Frederick, and Miss Gladys Mary Murray were married June 25.

Dr. Cleo D. Stiles, Jr., and Miss Annice Duncan, both of Baltimore, were married June 6.

**Deaths**

Dr. Frederick Louis Detrick, Baltimore, aged 42, died June 4 of heart disease.

Dr. Carroll Gideon Bull, Baltimore, aged 46, died May 31.

## MISSISSIPPI

The North Mississippi Society, composed of Benton, Lafayette, Marshall, Panola, Tippah, Union and Yalobusha Counties, was granted a charter during the year.

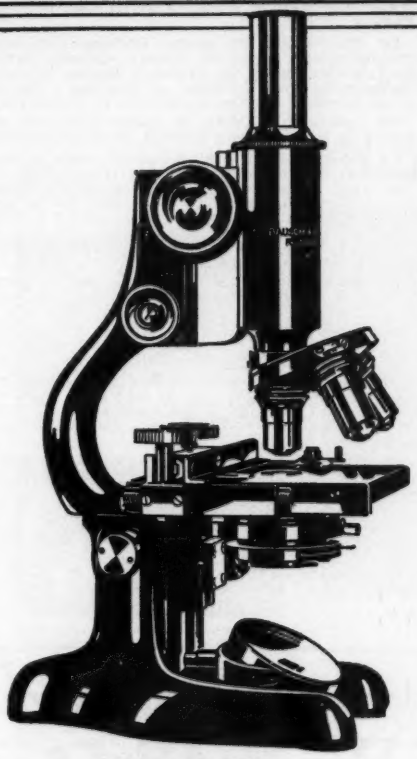
The State Association reports a loss of only a hundred members for the year, in spite of the economic depression.

The Tri-County Medical Society at a recent meeting at Brookhaven, gave their approval officially of the community hospital idea which was promulgated at the State Meeting in the Spring.

Miss Merchant is the new technician of the King's Daughters' Hospital at Brookhaven.

Dr. Taswell Paul Haney, Jr., Lexington, is the newly appointed Director of the Health Unit in Pike County which will be established soon.

Continued on page 38



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Continued from page 36

Dr. James T. Googe, Meridian, is the new Director of the Lauderdale County Health Unit.

Dr. William M. Adams, Boonville, has been taking post-graduate work in New Orleans.

Dr. C. C. Applewhite, Jackson, was on the program of the Texas State Medical Association meeting in May.

Dr. S. H. Woods, Benton, has been assigned to duty in government medical work in Panama, where he will make his home.

Dr. D. D. Johnson, Belmont, has been a patient in a Memphis hospital.

Dr. Robert Gowing has moved from Pontotoc County to Calhoun County where he will locate.

Dr. P. H. Rayburn, Natchez, has been elected House Surgeon of the Natchez Hospital. Dr. J. A. Rayburn is Superintendent; Dr. G. H. Butler, Assistant Superintendent; and W. D. Deterly, Secretary.

Dr. George H. Butler, Natchez, and Miss Mildred Bradford were married April 11.

**Deaths**

Dr. Louis D. Dickerson, McComb, aged 61, died June 4 of pneumonia.

Dr. Joseph Meredith Catching, Hazlehurst, aged 74, died May 18 of coronary thrombosis.

Dr. G. W. Barlow, Lake, died May 14, of cerebral hemorrhage.

Dr. D. Rube Lamb, Artesia, aged 51, died May 25.

Dr. G. M. Westmoreland, Batesville, aged 78, died in April.

## MISSOURI

Dr. William H. Mook, St. Louis, is the newly elected President of the American Dermatological Association. Dr. Mook is Assistant Professor of Clinical Dermatology, Washington University School of Medicine.

Dr. Sam Roberts, Kansas City, had a tour of the city for members of the American Board of Otolaryngology who were in Kansas City on their way to Los Angeles.

Dr. Carl Barck, St. Louis, Professor Emeritus of Ophthalmology in the St. Louis University School of Medicine, was given the degree of Golden Doctorate in Medicine by the University of Freiburg. Dr. Barck is an alumnus of the University of Freiburg.

Dr. Lawrence T. Post, St. Louis, has been elected Editor of the American Journal of Ophthalmology.

Dr. George Gellhorn, St. Louis, Director of the Department of Gynecology and Obstetrics of St. Louis University School of Medicine was elected President of the American Gynecological Society at its meeting recently in Hot Springs, Virginia, and Dr. Otto H. Schwarz, St. Louis, Professor of Obstetrics and Gynecology at Washington University School of Medicine, was elected Secretary.

Dr. Francis Reder, St. Louis, was on the program of the Pan-American Medical Congress in Mexico City in July.

The Missouri Crippled Children's Service of the University of Missouri held a series of clinics recently for crippled children.

The University of Missouri is reinaugurating a Junior Curriculum for the 1931-32 scholastic year. There will be eight students in the medical school who will be the first students in this junior class at the medical school.

Dr. Elsworth S. Smith, St. Louis, was elected Secretary by the American Therapeutic Society at its recent meeting in Atlantic City.

**Deaths**

Dr. St. Elmo Sanders, Kansas City, aged 58, died June 1 of pneumonia.

Dr. Eustathius Anderson Chancellor, St. Louis, aged 77, died June 3 of heart disease.

Continued on page 40


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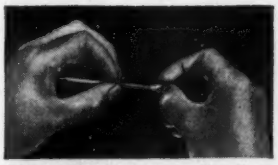
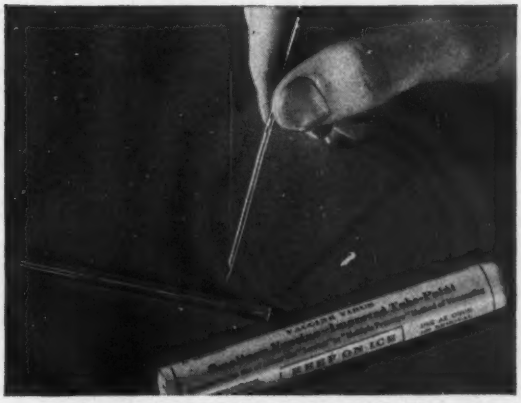


Place rubber bulb on small end of tube-point and break the tip inside the bulb.

Break the tube-point at the file mark without contamination of the tip.

Expel the virus from the tube directly on the previously cleansed area of the skin.

Transfer tube-point to right hand. Holding point parallel to the skin surface, apply pressure through the virus, with an up and down motion, repeated 20 to 30 times.



Busy physicians appreciate the time-saving Mulford Tube-Point. Four simple operations.

SPEED and greater safety are brought to smallpox vaccination through the Mulford Improved Capillary Tube-Point—a sterile, sealed vaccine container and inoculating instrument all in one.

This unique time-saving container is ready for immediate use with any of the approved technics—multiple-pressure, puncture, or scratch.

And, of course, it contains Smallpox Vaccine Mulford—another reason for its use. Here is a vaccine which delivers a high percentage of "takes"...which is uniform and reliable...which always carries assurance of potency and purity, because exhaustive tests are carried out on each lot before release...and which is backed by over 30 years' continuous experience and research. It is a product you can rely on.

• • •

Smallpox Vaccine Mulford is available in the following packages:

Capillary Improved Tube-Points—Single's and Ten's.
Capillary Tubes—Ten's.

**MULFORD BIOLOGICAL LABORATORIES**

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OXYGEN MIXTURES

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In recent years every so often some new forms of anesthetics have been put on the market, sometimes with most startling claims, but they do not stand the test of time. Simple, like air itself, which is a gas, our products are more largely consumed than ever before, and constantly growing. They combine simplicity, permanent purity, safety to all, easy control, and prompt recovery of the patient.

We also offer Anesthetic Equipment, Pressure Reducing Regulators, Bedside Stand Inhaling Outfits, Oxygen Tents, Resuscitation Apparatus, and Wilson Soda Lime.

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**"STORM"** The New "Type N" STORM Supporter

"Type N"

With long laced back and low extension upon hips: The reinforcing band attached in front at median line, also fastened in back. Hose supporters instead of thigh straps.

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Gives perfect uplift and is worn with comfort and satisfaction. Many variations of the "Type N" Belt provide support in Ptosis, Hernia, Obesity, Pregnancy, Sacroiliac Strain, etc.

**Each Belt Made to Order** **Ask for Literature**

**Katherine L. Storm, M. D.**

**Originator, Owner and Maker**

**1701 Diamond St., Philadelphia, Pa., U.S.A.**

Continued from page 38

Dr. August Ellersieck, St. Louis, aged 57, died June 2.

Dr. Albert L. Gray, St. Joseph, aged 74, died June 8.

## NORTH CAROLINA

Dr. James M. Parrott, Kinston, is the newly appointed State Health Officer and Secretary of the State Board of Health, succeeding the late Dr. Charles O'H. Laughinghouse.

A new hospital building for negro crippled children which is a Duke Memorial, was dedicated recently at the North Carolina Orthopedic Hospital at Gastonia.

At a recent meeting of the Eighth District Medical Society in Winston-Salem, Dr. S. G. Jett, Reidsville, was elected President; Dr. Carl V. Tyner, Leaksville, Vice-President, and Dr. T. C. Redfern, Winston-Salem, Secretary-Treasurer.

At the recent meeting of the Second District Medical Society at New Bern the following officers were elected: Dr. DeWitt Kluttz, Washington, President; and Dr. Joshua Tayloe, Washington, Secretary.

Dr. W. J. B. Orr, Smithfield, founder and builder of the Johnston County Hospital, has moved to Washington, D. C.

There was recently formed the North Carolina Radiological Society with Dr. J. K. Pepper, Winston-Salem, President; Dr. W. G. Rainey, Fayetteville, Vice-President; and Dr. M. I. Fleming, Rocky Mount, Secretary-Treasurer.

Dr. C. S. Grayson, High Point, is the newly elected Mayor of that city.

Dr. Thurman D. Kitchin, Wake Forest, President of Wake Forest College, and Dean of the Medical School of Wake Forest College, was named to serve on the Commission for the Improvement of the Laws of North Carolina, which was provided by the last General Assembly.

The State Board of Medical Examiners met recently at Raleigh, where 121 took the examinations.

### Deaths

Dr. Lacy D. Wharton, Smithfield, aged 62, died June 15.

Dr. T. A. Kirkman, Siler City, aged 71, died May 24.

## OKLAHOMA

Dr. Daniel W. White, Oklahoma City, is spending the Summer in Europe visiting the Old World clinics.

Dr. Calhoun Doler, Elk City, is the newly appointed Superintendent of the Western Oklahoma Tuberculosis Sanatorium at Clinton, succeeding Dr. Elmer E. Darnell, resigned.

### Deaths

Dr. William Edgar Rawls, Paoli, aged 60, died March 8.

Dr. Herzon U. Daugherty, Vinita, aged 79, died March 18 of angina pectoris.

## SOUTH CAROLINA

Dr. Edgar A. Hines, Jr., Seneca, has received a Fellowship in Medicine at the Mayo Foundation, Rochester, Minnesota.

Dr. George T. Tyler, Greenville, Chairman of the Committee on Post-Graduate Clinics, arranged Clinics in July at the South Carolina Sanatorium at State Park. Dr. Paul Ringer, Asheville, North Carolina; Dr. P. P. McCain, Sanatorium, North Carolina, and Dr. J. B. Sidbury, Wilmington, North Carolina, assisted in holding these clinics.

## TENNESSEE

Dr. John A. McCulloch, Maryville, has been doing special work in venereal diseases at the Government Hospital at Hot Springs, Arkansas.

Dr. D. J. Johns, Jr., Nashville, has moved into his new office in the Medical Arts Building.

Continued on page 42

*Patient Types . . .*

## The Expectant Mother

DURING the anxious period of pregnancy, you are "the law and the prophets" to the woman. Sympathy and understanding incline you to select a smooth, palatable and comfortable aid to the essential normal peristalsis. What better meets such requirements than Petrolagar?

To avoid bowel complications of pregnancy, Petrolagar is prescribed as a harmless routine.

Petrolagar has many advantages in maintaining bowel function. It is palatable and does not interfere with digestion. It produces normal, soft-formed fecal consistency, providing real comfort to bowel movement.

Petrolagar is an emulsion of 65% (by volume) mineral oil with the indigestible emulsifying agent, agar-agar.

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Gentlemen:—Send me copy of "HABIT TIME" (of bowel movement) and specimens of Petrolagar.

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**OLEO-GOMENOL**

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**CYSTITIS**

℞ 5 to 15cc, by injection direct into the bladder.

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**Exclusive Agents in the United States**

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**MANHATTAN EYE SALVE COMPANY**

**Louisville, Kentucky**

Continued from page 40

Dr. William N. Lackey, Gallatin, has been taking a post-graduate course at Vanderbilt.

The Vanderbilt University School of Medicine has invited Dr. Francis R. Fraser, Director of the Medical Clinic and Professor of Medicine in the Saint Bartholomew's Medical School and Hospital in London, to deliver the Abraham Flexner Lectures during the year 1932-1933 at Vanderbilt University.

**Deaths**

Dr. Raymond Roscoe Wall, Memphis, aged 35, died May 19 as the result of sinusitis.

Dr. William Little Davies, Brunswick, aged 74, died May 4 of myocarditis.

Dr. Frank Shields Crockett, Nashville, aged 78, died June 5 of myocarditis.

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**TEXAS**

The Dallas County Medical Society honored Dr. Edward H. Cary, Dallas, with a dinner upon his return from the American Medical Association meeting in Philadelphia, where he was elected President-Elect of the Association.

Dr. Ernest H. Hamilton, Longview, is the newly appointed Health Officer of Gregg County, succeeding Dr. Eugene E. Terry.

Dr. Wilson Crosthwait, Waco, has recently assumed his duties as City Health Officer, succeeding Dr. Thaddeus E. Tabb.

County Health work in Williamson County has had to be abandoned as a measure of economy.

The Harris County Medical Society recently was addressed by Dr. Paul R. Stalnaker, Washington, D. C.

The North Texas Medical Association held its one hundred and first semi-annual meeting in June in Denton.

Dr. W. E. Ryan, Midland, was recently elected President of the Rotary Club in Midland.

The Midwest Hospital-Clinic at Midland was formally opened on National Hospital Day in May. The Hospital was built by Dr. W. E. Ryan.

Dr. George D. Gammon, Dallas, recently spoke to the Waxahachie High School on the subject of "Child Health."

Physicians and dentists of San Antonio have received protection against credit loss by the founding of the Professional Acceptance Corporation of San Antonio, which will take care of physicians' accounts and will finance the accounts of patients on the budget plan.

Longview has a new General Hospital which was formally opened in June. It will be available to every licensed physician and surgeon in Longview and Gregg County.

The Baptist Hospital at Houston has inaugurated a series of free health forums, the programs for which are furnished by the Hospital Staff. More than two thousand attendance has been recorded at each forum.

The Harris County Medical Society had as a guest speaker Dr. Samuel G. Gant of New Rork.

Dr. John B. Deaver, Philadelphia, was a guest speaker at a meeting of the Dallas County Medical Society in Dallas.

Dr. T. M. Collins, Big Springs, and Mrs. L. E. Durham were married in Dallas May 3.

**Deaths**

Dr. R. H. T. Mann, Texarkana, aged 73, died April 17 of carcinoma of the stomach.

Dr. Thomas Gustus Hill, Houston, aged 47, died April 25.

Dr. W. B. Pruitt, Glen Rose, aged 66, died May 23 of heart disease.

Dr. Louis Githens Witherspoon, Presidio, aged 58, died April 19 in California.

Dr. George William Bolin, Buffalo Springs, aged 76, died April 6.

Continued on page 44

*Gilliland*

# Biological Products

## Preventive Group

### Small-Pox Vaccine

Supplied in hermetically sealed capillary tubes with sterile needle for each vaccination.

Packages containing 1, 2, 5 and 10 tubes and needles.

Large quantities sent in ice chests.

### Typhoid Vaccine

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Supplied in both individual and bulk packages. Prepared after the method employed in the Army Medical School, in laboratories especially equipped.

### Toxoid

(Anatoxine-Ramon)

Supplied in packages containing 2-1cc. Vials and 20-1cc. Vials, also in a bulk package containing 30cc. A vial of diluted Toxoid for the reaction test is included in each package.

### Toxin-Antitoxin

(Horse or Goat Origin)

Supplied in both individual and bulk packages. Toxin-Antitoxin from horse origin supplied on all unspecified orders. Prepared by the most recently improved methods.

### Tetanus Antitoxin

The 1500 Units package is very convenient, being supplied in a highly concentrated form, in syringe or vial as preferred.

**The 1931 Gilliland catalogue is being distributed.**

**Please notify us if you have not received your copy.**

## The Gilliland Laboratories, Inc.

**Marietta, Pa.**

Continued from page 42

Dr. Lawrence Lafayette Griffin, Beeville, aged 51, died April 16 of coronary thrombosis.

Dr. W. R. Campbell, Chapel Hill, aged 66, died January 10.

## VIRGINIA

The Amelia County Medical Society met in May and elected Dr. G. Craig Eggleston, Amelia, President; and reelected Dr. G. A. Arhart, Amelia, Secretary-Treasurer.

The Norfolk County Medical Society met in June and elected Dr. H. L. Myers, Norfolk, President; Dr. Joseph D. Collins, Portsmouth, Vice-President; Dr. Lockburn B. Scott, Norfolk, reelected Secretary-Treasurer.

Dr. William C. Stephenson, Jr., is opening offices in the Medical Arts Building in Roanoke.

Grace Hospital, Richmond, is being enlarged by the addition of a four story and basement annex which is now under construction.

Preparation is under way for the annual meeting of the Virginia State Society at Roanoke in October. The Patrick Henry Hotel will be official headquarters.

Dr. J. Shelton Horsley, Richmond, received the honorary degree of LL.D. at the commencement exercises of the University of Richmond in recognition of his contributions to the science of surgery.

Dr. Charles Armistead Blanton, Richmond, has received the honorary degree of LL.D. from Hampden-Sidney College, in recognition of his service to that institution.

Dr. Ambrose McGee, Richmond, had an exhibit on whooping cough at the American Medical Association meeting in Philadelphia in June.

Dr. Allen Fiske Voshell, Professor of Orthodepdic Surgery at the University of Virginia, has resigned to become Professor of Orthodedic Surgery in the School of Medicine, University of Maryland and College of Physicians and Surgeons, Baltimore.

The Medical College of Virginia has opened a special obstetrical delivery service which is in charge of Dr. H. Hudnall Ware, Jr., of the college faculty.

The Medical College of Virginia recently held postgraduate clinics at St. Phillips Hospital for negro practitioners.

The Out-Patient Department of the Medical College of Virginia reports that during the month of May they had 3,893 visits to the Clinic, the busiest month recorded in the history of the Clinic.

Dr. Frederick Plicher, Jr., has recently become assistant Resident on the Urological Service of the University of Virginia Hospital, University.

Dr. Warren F. Draper, Assistant Surgeon General, U. S. Public Health Service, Washington, has been appointed State Health Commissioner by the Governor.

Pittsylvania County has a new Health Unit and Welfare Department which began operation June 1.

Dr. Clarence Porter Jones, Newport News, is the newly elected President of the Virginia Society of Otolaryngology and Ophthalmology; Dr. Courtney Edmond, Clifton Forge, is Vice-President; and Dr. Henry Grant Preston, Harrisonburg, Secretary-Treasurer.

The Virginia Public Health Association elected Dr. Peyton M. Chichester, Clarendon, President; Dr. James J. McCormick, Norfolk, Vice-President; and Dr. Allan L. McLean, Richmond, Secretary-Treasurer.

Dr. J. B. McKee has moved from Plasterco to Glade Springs.

Dr. William Lett Harris and Mrs. Gertrude E. Burgess, both of Norfolk, were married June 20.

Dr. Claude C. Coleman, Richmond, and Mrs. Ruth Threadcraft Putney were married June 16.

Dr. Frank E. Handy, Appalachia, and Miss Ruth Harrison Smith were married June 17.

Dr. Robert Tunstall Peirce, Jr., Newport News, and Miss Ruth Tinsley Hurt were married June 11.

Dr. Grant R. Elliott, Norfolk, and Miss Beatrice V. Holland were married June 6.

Dr. Oscar William Cranz, Richmond, and Miss Flora Elizabeth Jett were married June 4.

Dr. Samuel Byron Pope, Jr., Norfolk, and Miss Emma Lucile Ryerson, were married June 24.

Dr. John R. Hamilton, Nassawadox, and Miss Gladys Lee were married June 10.

### Deaths

Dr. Enion Gifford Williams, Richmond, State Commissioner of Health, aged 57, died June 6 of cerebral hemorrhage.

Dr. Joseph Nicholson Barney, Fredericksburg, aged 64, died April 30 of arteriosclerosis.

Dr. John Wesley Carroll, Lynchburg, aged 51 died June 3.

Dr. Madison Redd Drewry, Cascade, aged 65, died suddenly June 2 of cerebral hemorrhage.

Dr. Cooper Dave Kunkel, Pulaski, aged 33, died June 11.

Dr. William M. Thompson, Culpeper, aged 63, died June 12 from heart trouble.

Dr. Thomas Washington Evans, Concord Depot, aged 76, died May 28.

## WEST VIRGINIA

The Tri-County Medical Society of Harrison, Marion, Monongalia Counties had as their guest speaker at a recent meeting Dr. William A. Frontz of Baltimore.

The Monongalia County Medical Society was addressed by Dr. Robert H. Jeffrey at the meeting in Morgantown recently.

Dr. William Price Bittinger, Summerlee, and Miss Susannah Brient were married May 27.


# Classified Advertisements

FOR SALE—Owing to the death of Dr. S. D. Rice, his estate offers for sale all his office equipment and library, at reasonable price. Wire, write or phone Mrs. S. D. Rice, Gainesville, Florida.

FOR SALE—McCaskey System Cabinet; large model; slightly used; in excellent condition; cost $285.00; will sell at real bargain. Joseph H. Smith, M.D., Farmville, Virginia.

ASSISTANCE OFFERED TO MEDICAL WRITERS. Research. Abstracts. Translations (all languages). Papers prepared from authors' data. Ten years' experience with leading physicians and appointments on medical journals of highest standing. I employ no assistants; all my work is done personally and is reliable. Florence Annan Carpenter, 413 St. James Place, Chicago, Illinois.

PATHOLOGIST desires place as Director of Laboratories or Associate; will also consider well established group. Age 34; married; 7 years in Clinical Pathology and teaching; grade A training; excellent references. C. W., care Journal.

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